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FINAL ENVIRONMENTAL STATEMENT
ON THE
TACTICAL FIGHTER WEAPONS CENTER (TFWC)
RANGE COMPLEX,
Nellis Air Force Base

SUMMARY SHEET

This final statement was prepared by the Department of the Air Force. For additional information about this proposed action, contact Dr Billy E. Welch, Special Assistant for Environmental Quality, SAF/ILE, Washington, D.C. 20330, (202) 697-9297.

PREFACE

A Draft Environmental Statement was published in June 1974 and discussed the proposed Continental Operations Range (COR); a proposal which involved a three phase program of improvement and integration of three existing military ranges (Tactical Fighter Weapons Center Range, Hill/Wendover/Dugway, and Fallon Naval Air Station). On July 30, 1974 a public hearing on the COR proposal was held in Las Vegas, Nevada. Subsequently the COR proposal was cancelled; however, proposed airspace changes and additional radar sites peculiar to the Tactical Fighter Weapons Center Range are still required. The utilization, air space proposals and proposed improvements for the Tactical Fighter Weapons Center Range Complex (TRC) are similar to those planned for this range under the near term COR concept; therefore, the environmental impacts associated with the proposals for the Tactical Fighter Weapons Center Range in the COR draft environmental statement remain valid and have been carried forward to this final environmental statement. Responses to comments received on the draft statement are found in Annexes A and B.

1. The proposal described is an administrative action.

2. Description:

This statement covers an FAA Airspace Proposal to redefine Restricted Areas R-4807, R-4808 and R-4809; designate Restricted Areas R-4807 and R-4809 as joint use; establish two special rules areas to the North and East of the Tactical Fighter Weapons Center Range and a proposal to construct roads and instrument trailer pads for additional ground based mobile electromagnetic radiators.

3. Environmental impact and adverse environmental effects of the proposed action:

The implementation of the airspace proposals and construction of the roads and instrument trailer pads is expected to have both beneficial and adverse effects. The adoption of the airspace proposals will result in

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better air traffic control and communications which will produce a beneficial impact on the operation and safety of all users. The proposals could cause some general aviation pilots to deviate around the Tactical Fighter Weapons Center Range Complex airspace which would affect fixed base operators in the vicinity. Electromagnetic emanations from the additional ground based electromagnetic radiators, constrained by duly prescribed range operations and safety precautions, should pose no undue hazards to people or equipment. The impact of noise and sonic booms is deemed chiefly noise annoyance to the human and natural environment, which has accommodated to the presence of noise in the area; thus the impact due to continued operations is not expected to be of significance. Supersonic activity is planned to avoid population areas, known structures, and random activities like known archaeological excavations so that the impact of sonic booms will be minimized. Ordnance expenditures will mostly be confined to the same locale as past activities over the last 30 years.

4. Alternatives:

   a. No action.

   b. Reduce scope of operations.

   c. Move to another location.

5. Agencies from which comments were received:

   a. Department of Agriculture, U.S. Forest Service

   b. Department of Health, Education and Welfare

   c. Department of Agriculture, Soil Conservation Service

   d. Department of the Interior, Missouri Basin Region

   e. Department of the Interior, Fish and Wildlife Service

   f. Department of Transportation, Federal Aviation Administration, Western Region

   g. Environmental Protection Agency, Region IX

   h. State of Nevada, Office of the State Planning Coordinator

   i. State of Nevada, Department of Fish and Game

   j. Nevada State Park System

   k. The Nevada State Museum

6. The draft environmental statement on proposed Continental Operations Range (COR) was made available to the Council on Environmental Quality and the public in June 1974.

7. The final environmental statement on the Tactical Fighter Weapons Center Range Complex (TRC) was made available to the Council on Environmental Quality and the public in March 1977.

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SUMMARY

Historically, the Air Force's ability to accomplish its mission has often been dependent on weapon systems and aircrews that have not been exercised in a realistic enemy environment. The Tactical Fighter Weapons Center (TFWC) at Nellis Air Force Base in Nevada has the mission of providing such an environment, which is accomplished through its two major subordinate units; the 57th Fighter Weapons Wing and the TFWC Range Group.

The Range Group is responsible for operating and maintaining the TFWC Range Complex (TRC). About 700 personnel are currently authorized for the Range Group, and this number is projected to increase to over 900 by 1982. The TRC consists of a North Range, a South Range, four airspace training areas and two electronic warfare ranges. The TRC is controlled through a Range Control Center (RCC) located at Nellis AFB. RCC personnel can now monitor the locations of medium and high altitude transponder-equipped aircraft, both civil and military, in the TRC

vicinity. Planned improvements will provide the capability to monitor the locations of transponder and non-transponder equipped aircraft at altitudes down to near-ground level in the TRC vicinity, and to communicate with the aircrews in those aircraft.

TRC utilization can be categorized in two types; routine usage and special projects. Routine usage (57FWW, 474TFW, Red Flag, etc.) accounts for a TRC utilization rate of about 37,200 sorties per year. This rate is expected to remain the same over the next few years. Special projects consist of large-scale operations, such as ACEVAL/AIMVAL (5,500 sorties) and EW/CAS (5,000 sorties) which will add to the total TRC utilization rates for each year. Although these projects are not the subject of this statement, their impact on the TRC and Nellis AFB is included. Other special projects that might occur will be assessed for environmental consequences as the need arises.

Many different types of ordnance is dropped on the North and South Ranges. This ordnance is in two categories; live and inert. The current (CY76) annual rate of ordnance deliveries is 700 tons/live and 3,000 tons/inert for a total rate of 3,700 tons per year.

This statement also covers an FAA Airspace Proposal to make certain amendments to the Federal Aviation Regulations that would:

1. Redefine Restricted Areas R-4807, R-4808, and R-4809.
2. Designate R-4807 and R-4809, as joint use.
3. Establish two special rules areas.

Many TRC operations are conducted under land use agreements with various agencies. The two major agencies are the Fish and Wildlife Service and the Bureau of Land Management, both of which are under the Department of the Interior.

TRC operations can impact the environment in the areas of airspace utilization, electromagnetic radiation, sonic booms and aircraft noise, air quality and ground activities. The major impact of the TRC Airspace Proposal would be the effect on general aviation. The proposal could cause some general aviation pilots to deviate around the TRC airspace which would affect fixed base operators in the TRC vicinity. Electromagnetic radiation does not currently have a significant effect on the environment, but future equipments may. Sonic booms in the airspace training areas continue to bring occasional complaints from local communities. This problem will probably intensify as newer and faster aircraft are brought into the Air Force inventory. The Navada Air Quality Implementation Plan contains projected allowable air pollutant emissions for military aircraft, as well as other aviation, which the state indicates are necessary for attainment of established air quality standards. The calculated emissions from aircraft operations at Nellis AFB are less

than these projected maximum allowable emissions. The primary concern with TRC ground activities is possible disruption of wildlife habitats and breeding and nesting behavior. The Air Force works closely with various state and national wildlife agencies to keep such disruption at a minimum.

The alternatives to the existing TRC are no action, reduce the scope of operations or move the entire operation elsewhere. Reducing the scope could be accomplished by either deleting the airspace training areas, or deleting the North Range and/or the South Range restricted areas. Loss of the airspace training areas or either restricted area would result in relocation of some Nellis manpower and equipment. Loss of both restricted areas would force relocation of the Nellis based 57FWW and 474 TFW which could cause closure of Nellis AFB. Moving the TRC operation elsewhere would also force relocation of the two Wings with a probable closure of Nellis.

SECTION ONE

DESCRIPTION

A - TRC Description

In the past, the capability of the United States Air Force to accomplish its wartime mission has often been dependent on weapon systems that have never been tested and evaluated in an operational environment of the type expected when required to engage the enemy. Similarly, the aircrews that utilize these weapon systems have not, in many cases, received adequate training for their employment. This condition has historically caused a high loss rate of manpower and equipment during the early days of a war. A study made of World War II and the Korean War revealed that the first ten combat missions flown by our aircrews were the most hazardous. Results of this study were substantiated by our experiences in the Vietnam War.

To alleviate this condition, a capability must be provided to operationally test and evaluate new weapon systems, and permit aircrew combat training, under conditions that simulate, as nearly as possible, an actual enemy scenario. This mission has been assigned to the Air Force's Tactical Fighter Weapons Center (TFWC) located at Nellis Air Force Base in Nevada. The TFWC accomplishes this mission through its two major subordinate units; the 57th Fighter Weapons Wing,

responsible for providing aircraft and aircrew personnel, and the TFWC Range Group, responsible for providing sufficient landspace, air-space, and ground equipment.

The 57th Wing is equipped with the latest generation of tactical fighter aircraft (currently the F-4 and F-111). As newer aircraft (e.g. the F-15, F-16, A-10) enter the Air Force inventory, small numbers of each will be assigned to the 57th Wing. The 57th is utilized to accomplish four major functions:

1. New weapon systems (both aircraft and associated equipment) are tested to determine their operational suitability in a combat environment. Results of these tests are utilized to identify improvements for the weapon systems so they can better fulfill their performance requirements.

2. Optimum tactics for the use of new weapon systems are developed and tested. These tactics are then published in documents which are utilized for combat training of all tactical aircrews throughout the Air Force.

3. The Wing's "Fighter Weapons Instructor Course" teaches selected aircrews how to best instruct other aircrews on the use of current and new generation weapon systems. After completion of the four month course, these instructor aircrews are assigned to each of the Air Force's worldwide tactical units where their expertise is utilized to help prepare all tactical aircrews for combat.

4. Two squadrons of small aircraft (T-38, F-5) are used to simulate enemy aircraft. Their pilots are trained to fly and fight like enemy fighter pilots. A large portion of these aircraft and aircrews, called "aggressors", are on continuous deployment to other tactical units to provide their aircrews with realistic air-to-air combat training.

The TFWC Range Group is responsible for operating and maintaining the TFWC Range Complex (TRC) shown in Figure A-1. About 500 personnel are currently authorized for the Range Group, and this number is projected to increase to over 900 by 1982. The TRC consists of a North Range, a South Range, four airspace training areas and two electronic warfare ranges. Two Energy Research and Development Administration (ERDA) agencies are located adjacent to the TRC North and South Ranges; the Nevada Test Site (NTS) and the Tonopah Test Range (TTR). The major function of the NTS is underground testing of live nuclear weapons. Various tenant agencies other than ERDA are also located at the NTS. The major function of the TTR is flight testing of warhead delivery systems, both aircraft and missile, that would be used in a nuclear conflict. Restricted airspace areas R-4808 and R-4809, extending from the surface to unlimited altitude, overlie the NTS and TTR respectively.

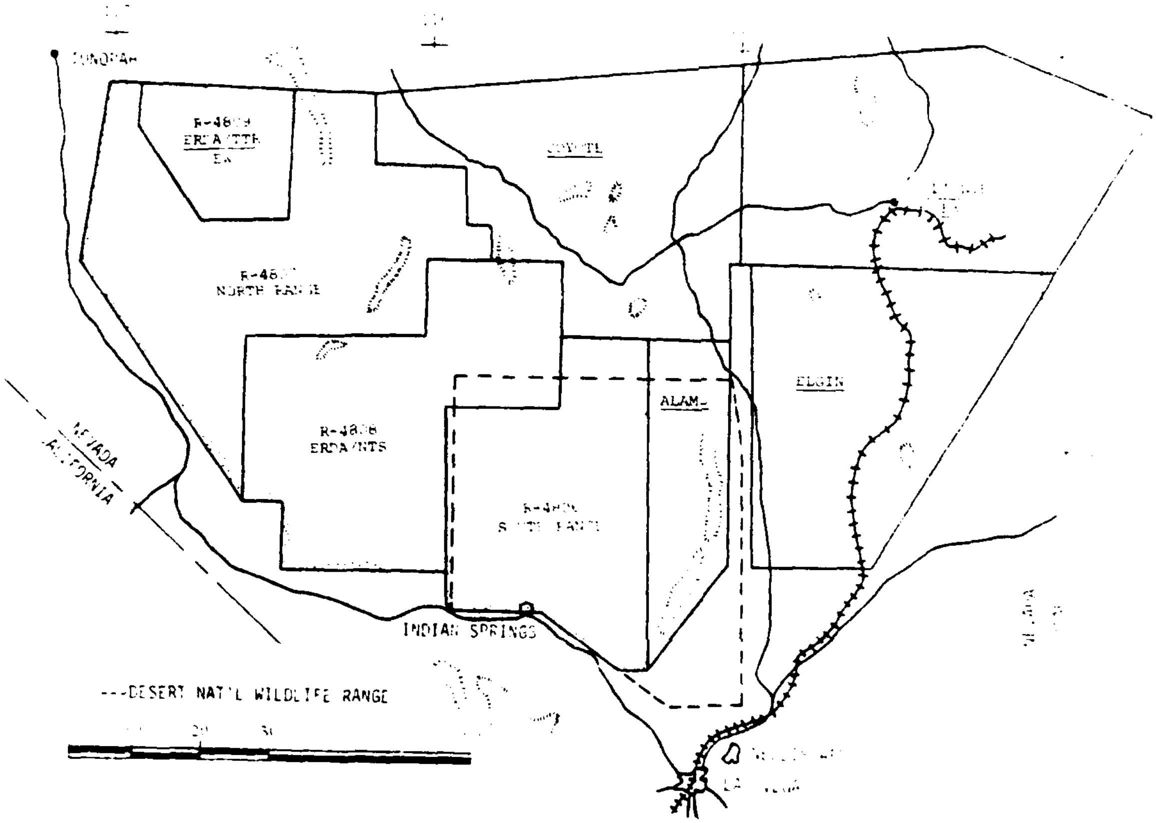


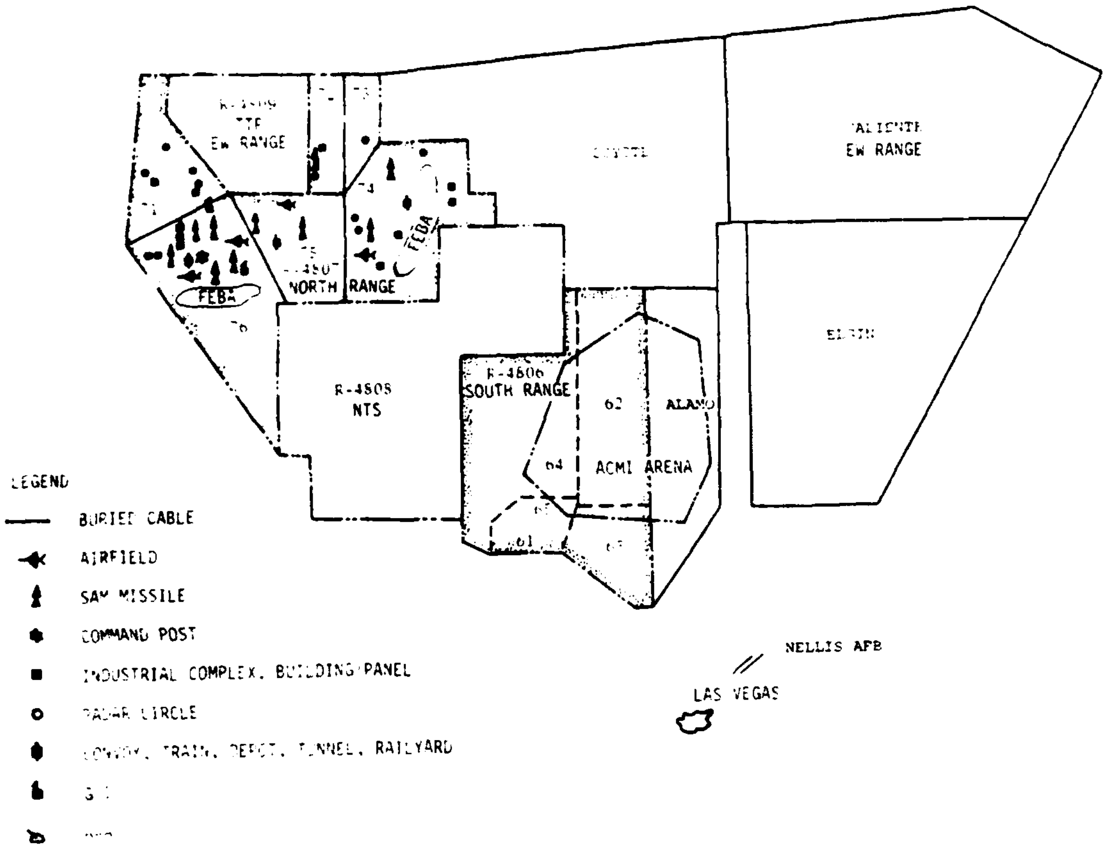
Figure A-1 - TFW Range Complex

TRC Description (Figure A-2):

North Range: The North Range covers a land area of approximately 1,500,000 acres. It is divided into six subranges for air-to-ground bombing and gunnery operations. Subranges 71, 72 and 73 are used primarily for radar bombing practice, while subranges 74, 75 and 76 are used primarily for visual bombing and gunnery practice.

The two most heavily utilized subranges, 74 and 76, have been developed to simulate two enemy target complex areas. Each contains an industrial complex, railyards, trains, convoys, airfields and an array of Surface-to-Air Missile (SAM) sites and Anti-Aircraft Artillery (AAA) sites. All the targets are positioned in accordance with the latest available intelligence information. A Forward Edge of the Battle Area (FEBA), consisting of numerous tanks, personnel carriers, battlefield SAM sites and AAA sites, is also located in each of the target complex areas for aircrews to accomplish close-air-support (near friendly troops) bombing and gunnery training. Future plans provide for development of subranges 71, 72, 73 and 75 similar to subranges 74 and 76.

Restricted airspace area R-4807, extending from the surface to unlimited altitude, overlies the North Range landspace. Supersonic flight operations are permitted down to 200 feet Above Ground Level (AGL) in R-4807.



Figur. A-2 - TRC Subranges

A portion of the 1,5000,000 acre North Range is in the Nevada Wild Horse Range which is administered by the Bureau of Land Management. A Letter of Agreement between the Bureau and the Air Force provides for management of wild horses and burros in this area. The Air Force also negotiates with the Bureau for use of small land segments to operate many of its threat radar simulators.

South Range: The South Range covers a land area of approximately 1,000,000 acres. 826,000 of these acres are in the Desert National Wildlife Range which is administered by the Department of Interior's Fish and Wildlife Service. Air Force use of the Wildlife Range is accomplished through a Memorandum of Understanding between the Interior Department and the Air Force. The memorandum restricts Air Force target construction to six small segments of the Wildlife Range that total about 126,000 acres. The South Range is divided into five subranges for air-to-ground bombing and gunnery operations. These subranges will also be improved in the future.

Subrange 61 is a small area utilized for presenting periodic fire-power displays to the public.

Subrange 62 is an unmanned range consisting of numerous targets that are constructed to simulate such enemy targets as SAM sites, AAA sites and ICBM missile sites.

Subrange 63 is a highly instrumented manned range that is used primarily for operational testing and evaluation of new weapon systems. It is equipped with precision tracking radars and cameras that surround a target area designed for precise scoring of air-to-ground munitions. Subrange 63 is also equipped with a television system to score practice bomb and rocket deliveries, and an acoustiscore system to score practice air-to-ground gunnery firing.

Subrange 64 is an unmanned range similar to Subrange 62. A close-air-support range, located on the southwest portion, is utilized by both airborne and groundbased forward air controllers to practice the critical mission of directing air strikes against enemy targets that are near friendly troops.

Subrange 65 is a manned range that is used to score practice munition deliveries. Two scoring towers are utilized to score practice bomb and rocket deliveries on circular targets. An acoustiscore system is used to score practice air-to-ground gunnery firing.

The South Range also includes two air-to-air gunnery training areas and an Air Combat Maneuvering Instrumentation (ACMI) arena. The two air-to-air gunnery areas, generally located over Subranges 62 and 64 respectively, are used by aircrews to practice gunnery firing at targets (called darts) that are towed behind other aircraft.

The ACMI arena is instrumented to permit real-time monitoring of up to eight aircraft engaged in simultaneous air-to-air combat training. Each participating aircraft carries a pod that relays numerous aircraft data to seven remote ground stations located around the periphery of the ACMI arena. The data is collected by a master ground station and then relayed via microwave to a large ACMI computer system located at Nellis Air Force Base. The computer is utilized to display a pseudo three-dimensional presentation of the air battle,

with continuous readout of each aircraft's flight parameters, on digitized scopes and large screens in a nearby display room. In addition to real-time monitoring, the ACMI missions can be taped and replayed later for aircrew debriefings and test mission analysis.

Restricted airspace area R-4806, extending from the surface to unlimited altitude, overlies the South Range landspace. Supersonic flight operations are permitted down to 5,000 feet AGL in R-4806.

Airspace Training Areas: Four airspace training areas, Coyote, Caliente, Alamo and Elgin, are located to the east of the North and South Ranges. Vertical coverage extends from 1,500 feet AGL to 58,000 feet above Mean Sea Level (MSL). A corridor between Alamo and Elgin provides access to the Coyote and Caliente areas.

The Federal Aviation Administration (FAA) has designated the airspace training areas as Air Traffic Control Assigned Airspace Areas (ATCAAAs). That portion of the ATCAAA airspace below 18,000 feet MSL is published in general aviation publications and charts as a Military Operating Area (MOA) to advise the civil aviation community of potential hazards involved if flight is performed through the area under Visual Flight Rules (VFR). FAA will not permit flight through the area under Instrument Flight Rules (IFR) unless safe aircraft separation can be insured. MOA designation above 18,000 feet MSL

is not required since all aircraft operations there must be IFR and under positive control of the FAA. Numerous military low altitude training routes, extending from the surface to 1,500 feet AGL, criss-cross underneath the MOA. These routes are used to practice low-altitude high-speed navigation, and they normally terminate in the north or south ranges for low-altitude bombing practice.

The Coyote, Alamo, and Elgin areas are used principally for air combat maneuvering training. Caliente is mainly used for electronic warfare training which will be described in the next section. Supersonic flight operations down to 5,000 feet AGL are permitted in the airspace training areas.

Electronic Warfare Ranges: Two Electronic Warfare (EW) ranges are located within the TRC; one in the TTR and one in the Caliente airspace training area. The purpose of the EW ranges is to provide an electronic environment for aircrews that simulates an environment typical of that expected in a real enemy target area. This environment includes electronic emissions from enemy SAM radars, AAA radars, early warning radars and groundbased jamming transmitters. Both TRC EW ranges are equipped with simulators of these enemy systems that replicate their electronic emissions. Like the enemy systems, the EW Range simulators are mobile which permits their periodic relocation on the ranges to change scenarios. The TFWC Range Group currently

possesses 20 such simulators, and this number is programmed to increase to over 100 simulators in the next few years.

Our combat aircraft are equipped with special warning receivers that will alert the aircrews when receiving enemy radar signals that could be a threat to their aircraft. Aircrew training on the use of these receivers, plus the associated maneuvers required to avoid the radar directed ground threats, is essential to help insure successful penetration of enemy defenses. Our aircraft can also be equipped with jamming transmitters and other specialized equipment designed to confuse enemy radar operators. The use of warning receivers, jamming transmitters and the other specialized equipment is called "Electronic Warfare".

Many of the EW Range simulators are instrumented to collect and record data from missions flown against them. This data is used to determine the effectiveness of airborne electronic warfare equipment and associated aircrew maneuvering tactics against enemy radar systems. The EW ranges will also be equipped with frequency spectrum analysis units to aid in determining electronic warfare effectiveness.

The Tonopah EW Range is operated in the TTR through an agreement between Air Force and ERDA. Its chief function is to provide a realistic electronic environment for both of the nearby North Range enemy target complex areas. Some of the Tonopah EW Range simulators

are located in Subrange 76 near the target areas to increase the electronic environment realism.

The Caliente EW Range is located in the Caliente airspace training area. Its major function is to provide an alternate range with a different electronic environment and different terrain features for diversified aircrew EW training.

During large-scale (multiple aircraft) operations, the two EW ranges are controlled simultaneously through an Air Defense Weapons Operations Center (ADWOC) at Nellis Air Force Base. Nellis aggressor aircraft are also used by the ADWOC battle staff to help defend the TRC target areas. This entire target area defense operation is called an Integrated Air Defense System (IADS), and is patterned after the enemy's existing Air Defense System. IADS personnel are trained to use enemy operational procedures when working against our aircrews, thus providing maximum combat realism. Currently undergoing tests are two additional means of providing combat realism for our aircrews; ground-to-air rockets and flashing beacon lights. The ground-to-air rockets (maximum range of a few hundred feet) will give the appearance of enemy surface-to-air missiles being fired at our aircraft to protect the general target complex areas. The flashing beacon lights, located near specific target areas, will look like enemy anti-aircraft gun muzzle flashes.

Range Control Center: Control of the TRC is accomplished through a Range Control Center (RCC) at Nellis Air Force Base. Positive range control is needed to promote increased range safety and more efficient use of range time. Two capabilities are necessary for RCC personnel to control range operations; they must be able to monitor the positions of all aircraft on the range, and they must be able to communicate with the aircrews in those aircraft.

Using inputs from FAA radars located near Las Vegas, Tonopah and Cedar City, the Range Group computer currently provides locations of transponder equipped aircraft, both civil and military, to the RCC for presentation on a large screen display. New equipment will be added in 1977 that will display non-transponder equipped aircraft as well. This new equipment, called Enroute Automated Radar Tracking System (EARTS), will interface the RCC control system with the FAA's air traffic control system to permit automatic aircraft handoffs (transfer) between FAA and the RCC when aircraft transit to and from the TRC. EARTS will also permit altitude display of aircraft equipped with certain transponders (includes all military and air carrier aircraft). The three FAA radars cover the TRC airspace down to about 10,000 feet MSL (about 5,000 feet AGL average). For optimum range control capability, radar coverage should extend downward to near the surface. To achieve this capability, four new radars, called gap-fillers, are programmed for installation at selected locations

within the TRC to augment the FAA radars. Inputs from these radars will be sent via microwave relay towers to the RCC. The gap-filler radar system should be operational in 1978. In the interim, existing systems (AMV, AMS, RMS) capable of tracking multiple transponder equipped aircraft down to a few hundred feet AGL are being installed in the high density portions of the range. Inputs from these systems will be microwaved to the RCC.

The second capability required for range control, communications, will be achieved this year through radio equipment that is now being installed in the North Range, South Range and Caliente EW Range areas. These radios will be remotely controlled from the RCC via microwave relay towers.

An additional measure of range safety and efficient utilization is provided by using computer scheduling of the many TRC subranges to identify conflicts and permit rapid schedule changes that are inherent in range operations.

Large-scale operations at the TRC are conducted under a Red (enemy), Blue (friendly), and White (umpire) Force concept. The Red Force consists of the enemy Integrated Air Defense System described earlier in the EW Range section. The Blue Force consists of all friendly forces participating in the operation. The White Force consists of the personnel and equipment necessary to monitor the Red Force/

Blue Force battle and evaluate the results. The White Force functions are accomplished through the RCC.

Remote controlled Television Ordnance Scoring Systems (TOSS) are planned for installation at high elevations in the North Range overlooking selected target areas. These systems contain TV cameras that can be aimed at different targets to observe munitions deliveries. The TV pictures will initially be microwaved to a facility in the TTR where the munitions deliveries will be scored and the results radioed to the aircrews. These pictures can also be taped for further analysis, if desired. Future plans call for microwaving the TV pictures to the RCC.

The combination of radar, communications, and TOSS will ultimately permit RCC personnel to monitor our aircraft as they transit to and from the target areas, maintain safe separation between our aircraft and other aircraft in their vicinity, observe the munitions deliveries and pass the scores to the aircrews.

B - TRC Utilization

The current and projected TRC utilization by aircraft sortie (one take-off and landing equals one sortie) is as follows:

Routine	1976	1977	1978
57FWW (Nellis)	17,500	17,500	17,500
474TFW (Nellis)	6,200	6,200	6,200
Red Flag*	8,100	8,100	8,100
Alpha Strike (Navy)	400	400	400
Other	5,000	5,000	5,000
Subtotal	37,200	37,200	37,200
Special			
ACEVAL/AIMVAL**	800	2,300	--
EW/CAS	--	--	5,000
Total	38,000	39,500	42,200

*The 57FWW supports Red Flag with about 1,800 F-5/T-38 sorties annually, which raises the Red Flag total to 9,900 annual sorties. These sorties are included in the 57FWW 17,500 sortie rate figure.

**The 57FWW will support ACEVAL/AIMVAL with 2,400 F-5 sorties; about 500 in 1976 and 1,900 in 1977.

57FWW: The 57th Fighter Weapons Wing at Nellis has a mixed assortment of aircraft that are utilized to support various TFWC missions. They currently possess 31 F-4s, 24 F-5s, 10 F-111s and 32 T-38s for a total of 97 aircraft. The 57th Wing flies an average of 19,000 sorties per year. About 92 percent of these sorties (17,500) utilize the TRC, of which approximately 1,800 are flown in support of Red Flag. An additional 5,700 transient aircraft (excluding Red Flag) pass through Nellis annually. Very few of the transit aircraft utilize the TRC.

474TFW: The 474th Tactical Fighter Wing is a tenant organization at Nellis. They currently possess 94 F-111 aircraft. The 474th has two major missions; aircrew training and combat readiness. One of its four squadrons is dedicated to providing initial training for all F-111 aircrews prior to their assignments to the many F-111 units in the United States and Europe. The other three squadrons must maintain the capability to deploy anywhere in the world on short notice and, once there, perform their assigned combat missions. The 474th Wing flies an average of 8,300 sorties annually, of which about 75 percent (6,200) utilize the TRC.

Red Flag: In view of the enemy's philosophy of heavily defending its target areas, large-scale integrated strikes, involving many different types of aircraft, would be required to successfully attack

those targets. Proper execution of such large-scale strikes would demand a tremendous amount of detailed planning and coordination by all participating agencies. Even more demanding is the positive inflight control of all the forces by strike force commanders to insure proper integration of the numerous aircraft missions. It is vital that as many of our aircrews as possible receive realistic training in planning and executing large-scale strikes prior to another war effort.

As stated in the TRC description, one of the TFWC major missions is that of providing a realistic arena for aircrew combat training. TRC landspace, manpower and facilities are utilized to accomplish this mission. To gain maximum benefit from the combat training environment at the TRC, the Tactical Air Command (TAC) initiated a program last year called Red Flag. This program calls for routine deployments of squadron sized units of tactical fighter aircraft (18-24) to Nellis for 3-4 weeks using the same procedures as would be used during an actual wartime response. Each tactical fighter squadron has a primary role of either air-to-ground bombing of enemy targets, or air-to-air combat with enemy aircraft. During Red Flag deployments, emphasis is placed on exercising the squadron's primary role.

As in a real war, various other types of aircraft are utilized to support the deployed squadrons. Some of the support aircraft operate from Nellis while the others operate from their home bases. The major roles of these aircraft include the following:

- Wild Weasel (threat radar suppression)
- Electronic Warfare (confusing enemy radars)
- Combat Air Patrol (protection from enemy aircraft)
- Unmanned Drones (decoys, electronic warfare)
- Strategic Bombing (heavy bombers)
- Forward Air Controllers (directing strikes near FEBA)
- Military Airlift (delivering supplies near FEBA)
- Reconnaissance (electronic and photographic intelligence)
- Air Refueling (extending range of mission aircraft)
- Rescue (downed aircrew recovery procedures training)
- ABCCC (Airborne Command and Control Centers)
- Special Forces (infiltration)

A representative Red Flag mission is depicted by Figure B-1. The strike force (Blue Force) is assigned a specific target in the North Range. The force, consisting of 12-16 aircraft configured with bombs to destroy the target, and 4-8 aircraft configured to protect the bombers from enemy aircraft, departs from Nellis. Shortly after departure, the force rendezvouses with tanker aircraft to perform air refueling as would normally be required in a real war. After refueling, the force is joined by 4-8 Wild Weasel aircraft which have the mission of protecting the force from the enemy threat radar nets. As the force approaches the target area, it is attacked by enemy aircraft (F-5s and T-38s under Red Force control) which attempt to disrupt the force formations and cause enough confusion to prevent a successful

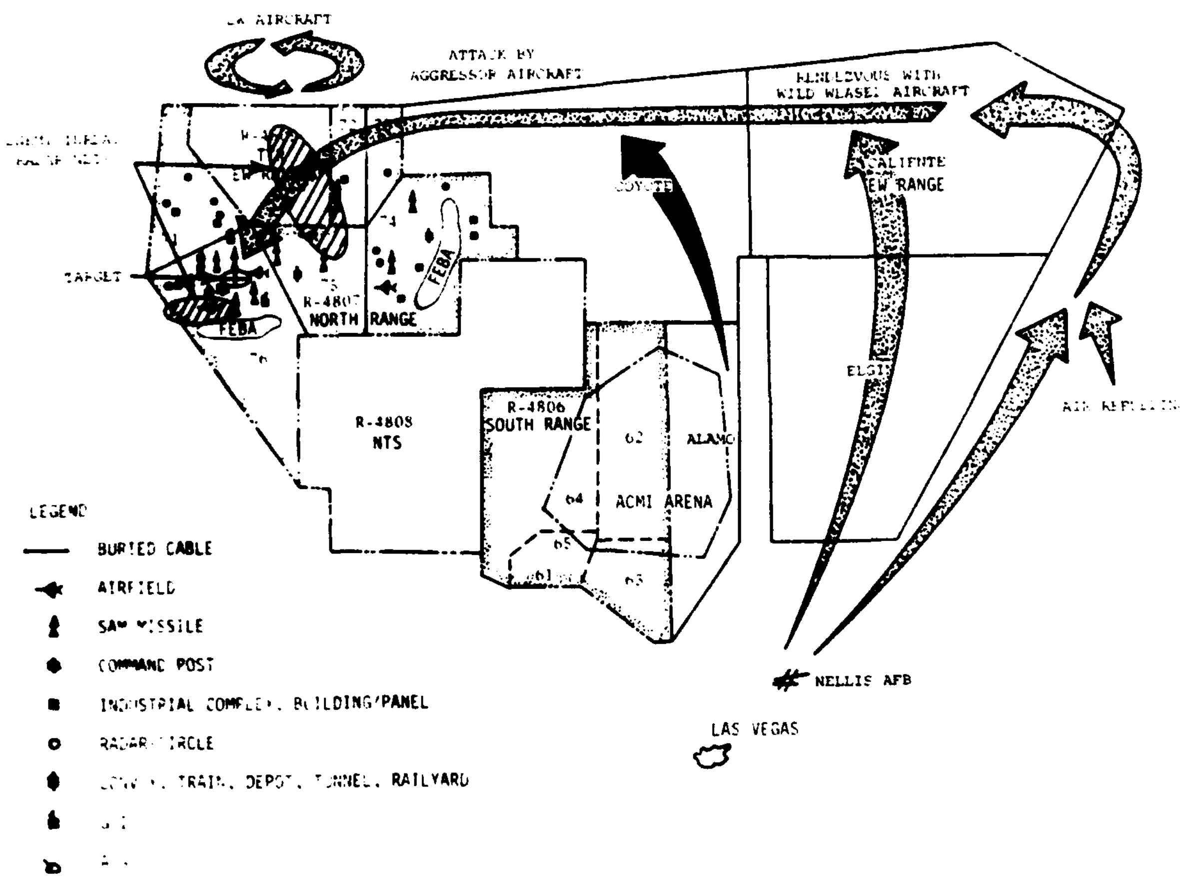


Figure B-1 - Red Flag Scenario

strike against the target. Just prior to striking the target, the force must penetrate an enemy threat radar net (also under Red Force control), equipped with an extensive array of SAM and AAA radars, that is positioned to protect the general target complex area. Other aircraft (Blue Force) orbiting close to the threat radar net are configured with electronic warfare equipment used to assist the strike force penetration by confusing the enemy radar operators. During the actual strike on the target, the force must avoid another threat radar net positioned to protect that specific target. The aircraft then return to their respective bases. Sufficient data is obtained from both the Blue Force and the Red Force for mission analysis personnel (White Force) to determine their effectiveness against each other.

In addition to TAC units, other agencies also participate in Red Flag operations. These include the Army, Navy, Air National Guard, Air Force Reserve, Pacific Air Forces, European Air Forces, Strategic Air Command, Military Airlift Command and Air Defense Command. Also, new weapon systems, such as the F-15 and A-10, are periodically flown with Red Flag forces to evaluate their performance in a combat environment.

Current planning calls for an average of nine Red Flag deployments per year. About 1,100 sorties are flown on the TRC during each deployment for an annual total of 9,900.

During previous deployments, all participating agencies have expressed very high enthusiasm with the results of Red Flag operations. Extensive reports of "lessons learned" during each deployment are sent to all concerned military agencies to help them better prepare for combat missions.

Alpha Strike: The Navy utilizes the TRC through a program called Alpha Strike, which was established to provide combat training for Naval tactical fighter units assigned to aircraft carriers. Alpha strikes are accomplished during those periods when the fighter units are operating from nearby Naval Air Stations (Miramar, Lemoore, Fallon) while their carriers are in port. Each strike is a large-scale operation consisting of 30-35 aircraft. An average of 12 alpha strikes are conducted at the TRC each year for an annual total of about 400 sorties.

Other: Numerous other units utilize the TRC on a routine basis, mostly from TAC, SAC, the Air National Guard and the Air Force Reserve. These units fly 400-450 sorties per month for a total of about 5,000 sorties annually.

ACEVAL/AIMVAL: ACEVAL/AIMVAL is a two-part project that will be conducted jointly between the Air Force and the Navy from late 1976

through most of 1977. The ACEVAL (air combat evaluation) portion will be flown to evalute the aerial combat capabilities of the F-14 (Navy) and F-15 (Air Force) fighter aircraft against F-5 aggressor aircraft that will utilize enemy tactics. The AIMVAL (air intercept missile evaluation) portion will be flown to obtain data that will be used to help select advanced air-to-air missiles for our newer aircraft. 5,500 sorties are planned for ACEVAL/AIMVAL, all of which will be flown from Nellis. 2,400 of these sorties will be provided by the 57FWW F-5 aircraft.

EW/CAS: A project to test the effectiveness of electronic warfare in a close-air-support role is being planned for the last half of 1978. Nellis is one location being considered for the project. If Nellis is selected, about 5,000 sorties, involving numerous types of aircraft similar to those used in Red Flag, will be flown at the TRC in 1978.

Many different types of ordnance is dropped on the TRC North and South Ranges during air-to-ground bombing and gunnery practice missions. This ordnance can be put in two categories; live and inert. Live ordnance is filled with explosive material and is the same type ordnance that would be used in a real war. Inert ordnance is shaped like live ordnance but is filled with a non-explosive material, such as concrete, to give it the same weight and aerodynamic characteristics.

Inert ordnance has the advantages of lower cost, less damage to target areas and reduced range clean-up problems for explosive ordnance disposal personnel. Nearly all ordnance dropped in the TRC is accomplished by Air Force aircraft operating from Nellis AFB, and Navy aircraft during their alpha strikes. The current (CY76) annual rate of ordnance deliveries is as follows:

	Tons Per Year		
	Inert	Live	Total
Nellis	2,800	400	3,200
Navy	200	300	500
	3,000	700	3,700

C - TRC Airspace Proposal

The FAA is considering amendments to Parts 71, 73, and 93 of the Federal Aviation Regulations that would (Figure C-1):

1. Redefine restricted airspace areas R-4807, R-4808, and R-4809.

2. Designate R-4807 and R-4809, as joint use restricted airspace areas and include them in the continental control area.

3. Establish two special rules airspace areas, Sadek North and Sadek East, adjacent to the above restricted airspace areas and designate them as joint use areas.

The proposal was published as a notice of proposed rulemaking in the 11 March 1976 issue of the Federal Register. It was originally published as an advanced notice of proposed rulemaking in the 12 June 1974 issue of the Federal Register. The entire proposal is contained at Appendix G.

As stated in the proposal, the Air Force has a requirement for a controlled operational environment large enough to allow participating aircraft to simulate combat conditions with the capability to test and

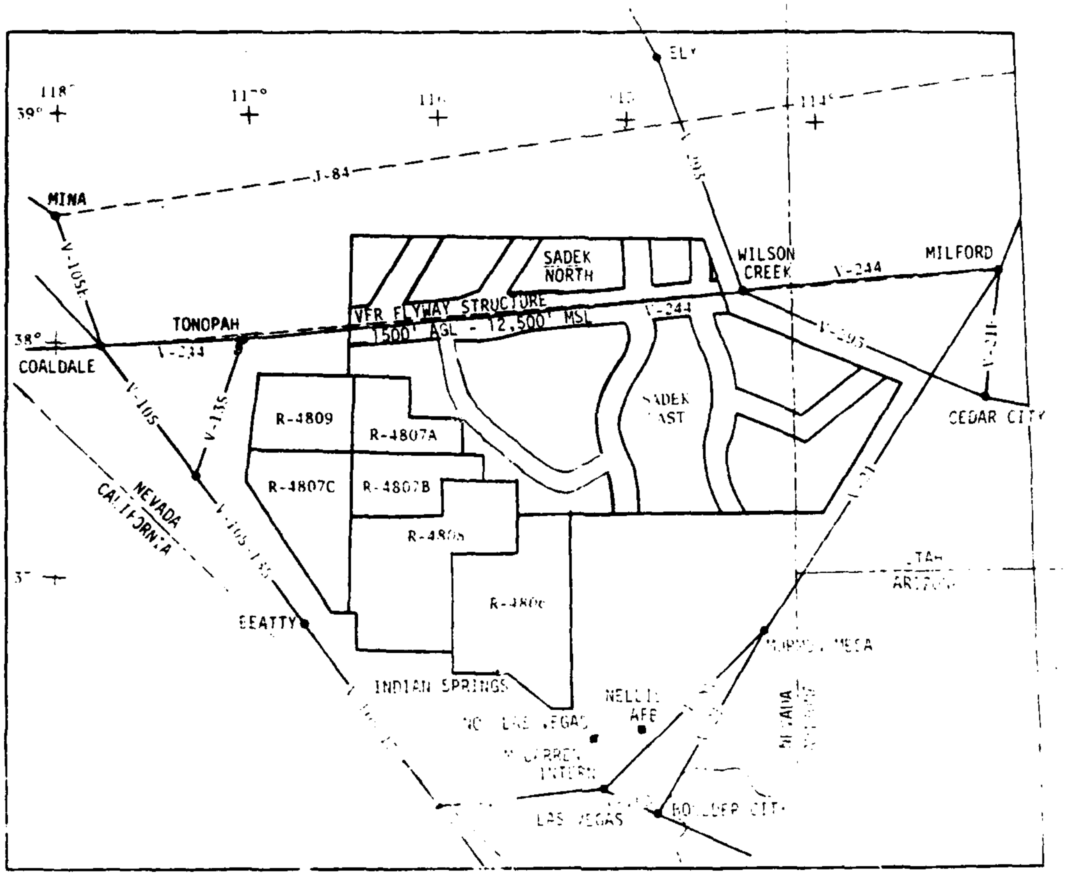


Figure C-1 - TRC Airspace Proposal

evaluate aircrew effectiveness in the delivery of airborne weapons, and the performance of combat tactics at supersonic speeds. The military activities include air-to-air combat maneuvering, air-to-ground attack maneuvering, simulated combat search and rescue, simulated combat tactical airlift, reconnaissance missions at low and intermediate altitudes and at varying speeds, tests of remotely piloted aircraft, and simulated strategic bombing missions. These missions would be flown by individual aircraft, small formations and, on occasion, as large-scale exercises.

The FAA is responsible for all airspace in the United States. By the FAA Act of 1958, the FAA administrator is empowered to grant what is, in effect, a license to any airspace user who can show need for a special use of airspace. In the case of a military users, the administrator established volumes of special use airspace and determines whether the FAA or the military shall control that airspace. The TRC airspace proposal refers to two types of special use airspace; restricted areas and special rules areas.

Restricted Areas:

Restricted areas are established by FAA rulemaking and are thus statutory in nature. They may be restricted to only one user or they may be joint use. The FAA has a policy of designating restricted areas as joint use wherever possible.

R-4807 and R-4809 would be designated as joint use. This will permit their temporary return to public use when the using agency has no requirement for them. Subdividing R-4807 and redefining R-4808 would simplify the measures required to effect the return by aligning the area boundaries more closely to the airspace actually used for specific testing or training operations. R-4808 would retain its single user (ERDA) designation. R-4806 is currently designated as joint use. R-4806, R-4807, R-4808, and R-4809 extend from the surface to unlimited altitude.

Supersonic flight operations are permitted in R-4806, R-4807 and R-4809. No private lands are located within these areas. Supersonic flight is not authorized in R-4808.

Special Rules Areas:

Where unique situations demand peculiar solutions to airspace problems, the FAA establishes special rules airspace areas in accordance with Part 93 of the Federal Aviation Regulations.

The operating areas within which the special rules apply would be used for operational testing and training under simulated combat conditions.

The maneuvers would involve flights at very high speeds, subsonic flights at low altitude, and vertical movement tactics. To accommodate this activity with safety, an area with low densities of population and air traffic is desired. The proposed operating areas were selected on that basis.

Each operating area would extend from 100 feet AGL to, but not including 18,000 feet MSL. The public may operate within these areas at all times and at any altitude that would be otherwise available to their aircraft, provided that an Air Traffic Control (ATC) Agency is notified, prior to entry, of the intended route, and that radio communications with ATC are maintained continuously, or to the extent limited by radio reception, while operating within either of these areas. Notification may be accomplished either by filing a flight plan or by inflight radio communications with ATC, prior to entering the areas, identifying the aircraft and its proposed route, including point of entry and exit (or destination), altitude and airspeed.

Several VFR flyways, generally of three nautical miles in width and extending from 1,500 feet AGL up to and including 12,500 feet MSL, would traverse each of the two operating areas primarily to accomoodate aircraft not equipped with radios. No prior notice, clearance or maintenance of communications would be required for any flight operation within these VFR flyways. However, pilots would be encouraged to contact ATC in the interest of safety.

D - Human and Natural Environment

Environmental impact assessment of the TRC (Figure D-1) must begin by gaining a thorough understanding of the environment, both human and natural, existing in the TRC area. Descriptions of the environments must be in sufficient detail to allow ready assessment of impacts.

In this section, detailed descriptions of the human and natural environments are presented. The human environment is further subdivided into airspace use, land use, demographic features, agricultural activities, grazing activities, archeological sites, and air quality. Similarly, the natural environmental descriptions are in terms of physiographic and climatic features, major biotic communities, important species, game animals, and migrating species.

Human Environment:

Airspace Use: Flying operations in the TRC airspace can be divided into three categories: military, commercial airlines, and general aviation. For purposes of this discussion, the TRC airspace can be divided into two areas as shown in Figure D-2; restricted airspace

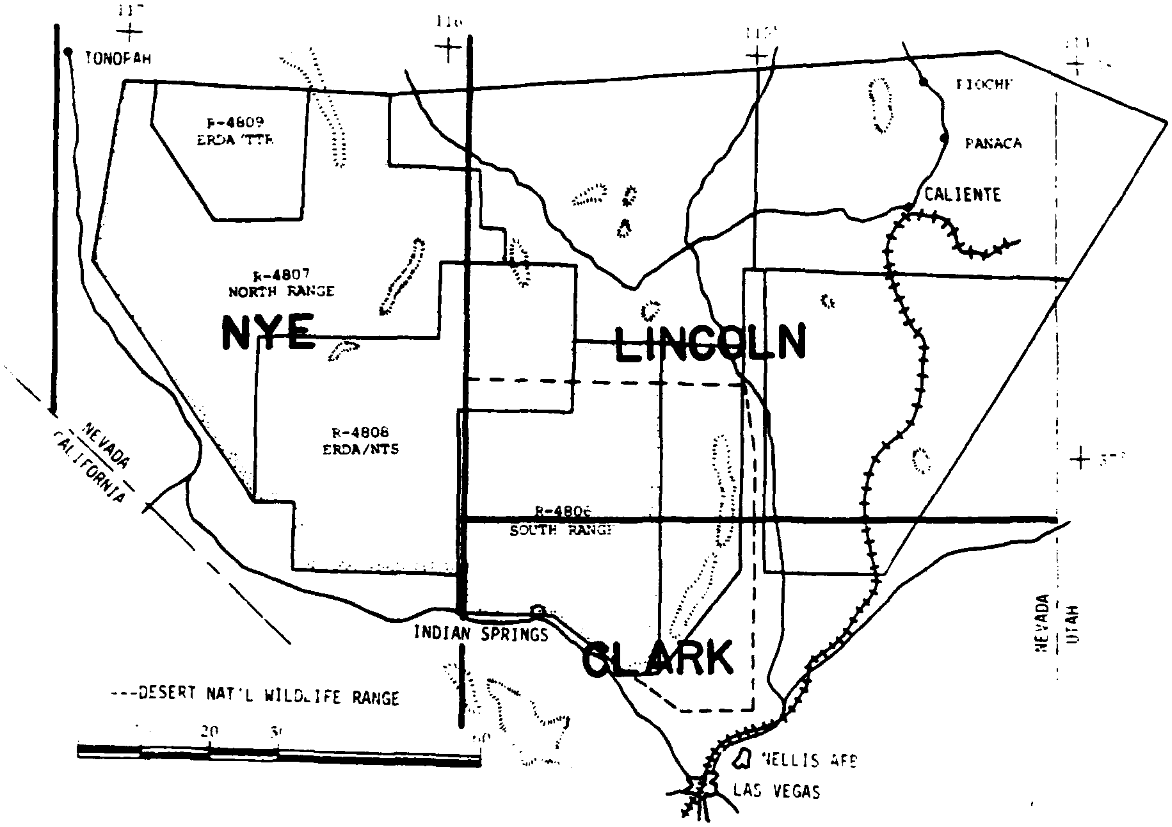


Figure D-1 - Town and County Locations

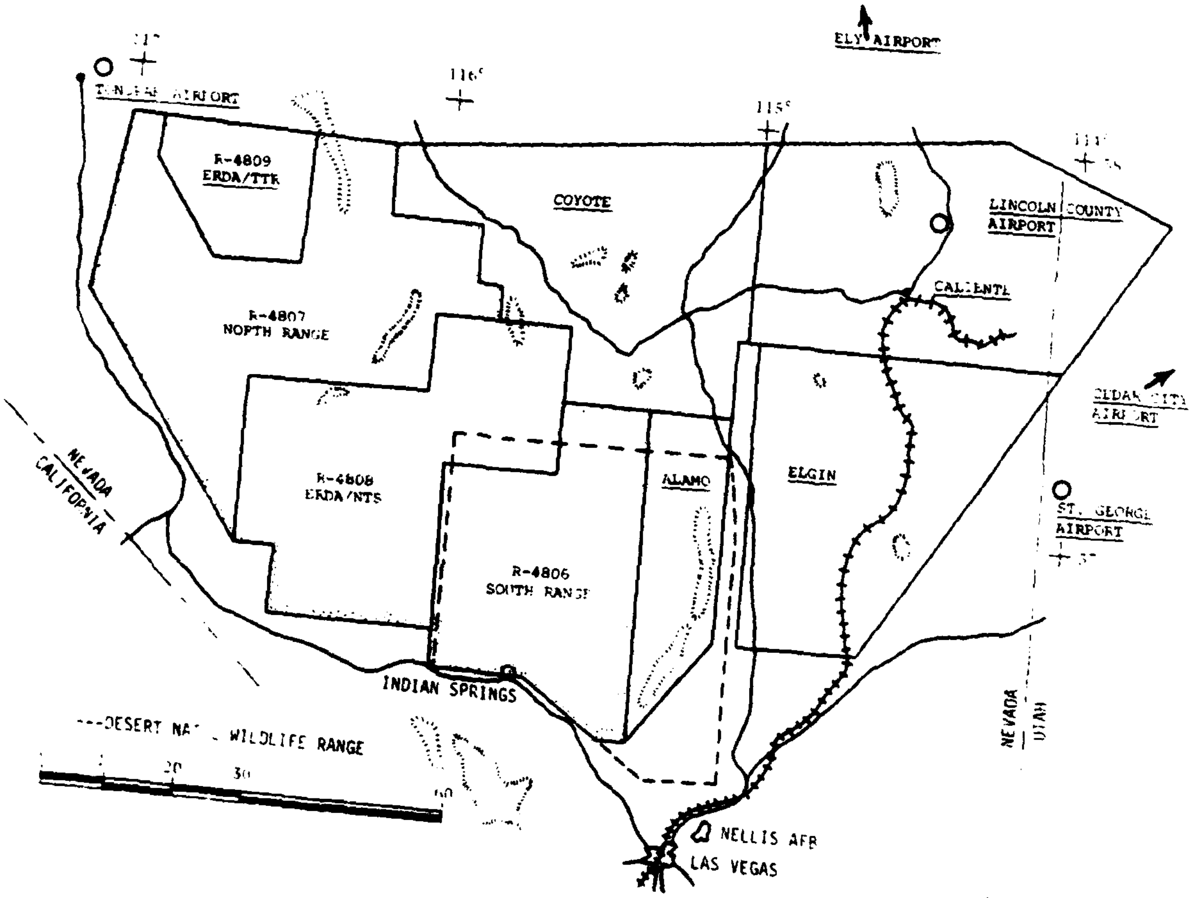


Figure 0-2 - Airports in the TRC Vicinity

areas (R-4806, R-4807, R-4808, R-4809) and ATC assigned airspace areas (Coyote, Caliente, Alamo, Elgin). The ATC Assigned Airspace Areas (ATCAAAs) are vertically divided into high altitude, above 18,000 feet MSL, and low altitude, below 18,000 feet MSL down to 100 feet AGL. The low altitude areas are depicted together on general aviation charts as a Military Operating Area (MOA).

Military operations in the TRC were described in Section 1B. The 37,000-40,000 annual sorties are flown in the restricted areas and the ATCAAAs (low and high) for an average of about 150 sorties per day, Monday through Friday. This daily rate is fairly consistent throughout the year.

Commercial airlines transit through R-4806 and the ATCAAAs when these areas are not in use by the military, normally at nights and on weekends. Nearly all airline flights are performed under Instrument Flight Rules (IFR) and, as such, are controlled by numerous FAA Air Route Traffic Control Centers throughout the country. The TRC airspace lies within the Los Angeles Center. Los Angeles estimates that an average of 10 airline flights transit the TRC daily.

General aviation consists mainly of small, privately owned, single and twin-engined aircraft. Most general aviation flights are performed under Visual Flight Rules (VFR) which are not controlled by an FAA facility. The remainder are flown under IFR and, like the airlines, are controlled by the FAA.

Since VFR traffic is not controlled, FAA has established Flight Service Stations (FSSs) at numerous airports within the United States whose major function is to provide advisory services to the general aviation community. These services include flight planning assistance, weather advisories, air traffic advisories and airport information. Four FSSs are located in the TRC vicinity; Las Vegas, Tonopah, Ely, and Cedar City. FAA estimates about 90 percent of general aviation pilots flying under VFR maintain radio contact with FSSs along their flight route.

General aviation flight operations within the TRC are in two categories; those that transit through the area to other parts of the country, and those that fly to-and-from landing fields within the TRC vicinity. These aircraft normally fly between 9,000 and 11,000 feet MSL at speeds between 100 and 200 mph.

General aviation aircraft that transit through the TRC fly the following general routes:

	Daily Flight Average
- Between Washington and Arizona	2
- Between Southern California and Utah	5
- Between Cedar City and Tonopah	3
Total*	10

*This average is based on summertime activity. Winter activity is about half, or five flights per day.

The Washington-Arizona and Southern California-Utah traffic that transits the TRC normally does so to utilize Lincoln County Airport as a refueling stop. The Cedar City-Tonopah traffic overflies Lincoln County Airport to avoid mountainous terrain along the northern TRC boundary, and stay within sight of public roads. FAA estimates about two to three of the daily transit flights are flown under IFR.

General aviation aircraft that fly to-and-from landing fields within the TRC vicinity fall in three categories:

	Daily Flight Average
- Aircraft Based at Lincoln County Airport	10
- Student Pilot Flights From Nearby Airports	3
- Farmer-Rancher Visits to Landing Fields Within TRC	2
*Total	15

*This total average is expected to increase to about 30 flights per day when Lincoln County Airport receives another training aircraft and a UNICOM radio (estimate June 1976).

The 10 daily flights in Lincoln County based aircraft consist of about 8 student flights, and 2 flights by aircraft owners. The student flights are normally flown in a student training area located 10 miles northeast of the airport. The aircraft owner flights are normally shopping trips to Las Vegas or southern California. Other student pilot flights are routinely flown to Lincoln County Airport from nearby airports in Las Vegas, St. George, and Cedar City.

Numerous farmer-ranchers, most of whom live in California, make periodic flight visits to their lands (leased from BLM) that underlie the TRC airspace. They either land at Lincoln County Airport or at private landing fields at their ranches, depending on the weather. While there, they normally make one or two flights to inspect their cattle.

The above figures are combined in the following chart to depict total current and planned non-military flight operations within TRC airspace.

	Daily Flight Average	
	Current	Planned
- Commercial Airlines	10	10
- General Aviation (Transit, Summer)	10	10
- General Aviation (Local)	15	30
Total	35	50

These figures do not include periodic flight operations (fixed Wing and helicopter) conducted by the U. S. Forest Service, the Bureau of Land Management and the State Fish and Game Department for various reasons, such as fire reconnaissance and wildlife management. Also not included are search and rescue activities, and aerial application (crop dusting) operations. Although these periodic operations will probably average about one flight per day on an annual basis, they can cause significant increases to flight operations on a given day (e.g. 15-25 flights per day for search and rescue, 25-50 daily flights for aerial application).

Land Use: The State of Nevada is easily classed as a "public lands" state inasmuch as 86 percent of the total land area is owned by the Federal Government and controlled and managed by various of its agencies. Distribution of responsibility for managing the lands depends on the principle purpose for which the land is to be utilized or protected.

The great preponderance of land is in the public domain and is largely unsuitable for agricultural development because of a paucity of water. This land is managed by the Bureau of Land Management (BLM) but it is utilized by ranchers and stockmen for grazing cattle and sheep. They do so under permits granted by the BLM, with the permits specifying the number of animals, seasons, and length of time the ranges may be used. These lands may also be utilized for other purposes but are subject to withdrawal for more specific purposes; for example, recreation, wildlife protection, or reclamation. The remainder of the land under public management was formerly part of the public domain but has been withdrawn for specified purposes.

The Forest Service has jurisdiction over a large portion of the timber lands of the state. The fundamental principle of management guiding the Forest Service is that these forested areas should serve many public purposes including production of timber, recreation, watershed protection, grazing of stock, and protection of wildlife. Only a minor fraction of land in the national forests is suitable for commercial production of timber; the other purposes are paramount.

In contract with the BLM and Forest Service, other public land tends to be utilized for specific purposes. Two of the best examples of this are the TRC and the Energy Research and Development Administration's Nevada Test Site and Tonopah Test Range.

The Desert National Wildlife Range is located adjacent to and overlapping a large portion of the TRC South Range (Figure D-2). This range, whose major purpose is preservation of the Desert Bighorn Sheep, is managed by the U.S. Fish and Wildlife Service of the Department of the Interior.

Private land is concentrated in the urban areas of Nevada, chiefly around Reno and Las Vegas, and in all areas where irrigation makes agriculture practical.

Because of its arid climate and the large fraction of the land in government ownership, Nevada is very sparsely populated and will probably continue to be so with the exception of growth at the urban centers of Las Vegas and Reno. The remainder of the state has scattered small communities and many large ranches. These factors combine to provide rural Nevada with unique qualities of solitude and quiet.

Modification of Air Force activities through improvement to the TRC may have impact of a variable nature on the region of Southern Nevada, the communities located in that region, and the people who

both live and visit there. Much depends on the intensity, location, and character of the use of the landspace and airspace. Much also depends on the values that are associated with the quality of life as it presently exists in the region. It is difficult to establish an accurate appraisal of the values the residents of Southern Nevada hold and the quality of their lives as perceived by them. However, we may point to some values expressed by historians and commentators on the quality of life in that state.

An early writer noted the attractions of the state in terms of its spaciousness and solitude and the unsophisticated nature of the people settled there. He further observed that the scarcity of water was largely responsible for Nevada's meager population and was also impressed with how intact its pristine environment was, with the exception of the small but visible excavations of past and present mining explorations and existing farming activities along the drainage bottom lands.

A more contemporary interpreter of the Nevada scene similarly observed its desert beauty and primitive qualities which seemed to give the area a measure of vastness and stillness. He observed how clear the atmosphere is and the cleanliness that it seems to give the rugged landscape. He noted, however, that because of man's alterations, the Nevada desert is no longer a true natural area but that it has retained much of its solitude which he felt is a major attraction of the region.

Whether or not these views and sentiments prevail throughout the communities in Southern Nevada is difficult to establish. We should note that in the cases of the Tonopah and Caliente/Panaca/Pioche areas, there is a history of accommodation to local Air Force uses of the environment which appears to be amicable for the most part.

Demographic Features:

Tables D-1 and D-2 show population, population growth patterns, and density for the extensive area surrounding the TRC. TRC personnel will operate from three areas; Nellis/Indian Springs, Caliente, and Tonopah. Thus, we are primarily concerned with the Clark County, Lincoln County, and Nye County areas.

Clark County's economy has two fundamental bases of strength: government spending and recreation. Employment in these two activities enjoyed phenomenal growth in the 1960s/1970s. Recreation, which now accounts directly for 25 percent of non-agricultural employment, nearly doubled in that decade. Business services employment has multiplied more than 400 percent. In comparison, manufacturing, which accounts for three percent of Clark County's employment, has increased by only 43 percent in this period.

Currently, the Federal Government and its contractors are the largest single employers in Clark County. The activities of Energy Research and Development Administration (ERDA) are

TABLE D-1

COUNTY POPULATION

	1970	1975	Percent Change	Density of People Per Square Mile (1975)
Clark	273,000	320,000	17%	40.3
Lincoln	2,500	2,500	0%	0.23
Nye	5,500	5,200	-7%	0.29

TABLE D-2

CITY POPULATION

	1970	1975	Percent Change
Caliente	980	960	-0.02
Henderson	16,400	19,400	18.5
Las Vegas	125,800	149,700	19.0
North Las Vegas	36,200	46,700	28.9
Panaca	540	530	-0.02
Pioche	640	630	-0.02
Tonopah	1,720	1,600	-6.8

primarily concerned with testing of nuclear weapons. These tests are of two basic types; military weapons and the testing of nuclear devices for peaceful uses (Plowshare Program). Approximately 4,500 persons are employed by ERDA and its contractors. ERDA's annual expenditure of approximately 140 million dollars includes about 65 million for personnel payroll and 75 million for facilities operation and maintenance.

Including its attached bases in Southern Nevada, Nellis AFB employs 6,500 military personnel and 1,200 civilians. These 7,700 workers have a total of about 17,000 dependents, bringing the number of persons depending upon Nellis AFB to over 25,000 which is roughly 8 percent of the 320,000 total population of Clark County. Nellis has an annual budget of approximately 140 million dollars, consisting of about 70 million for personnel payroll and 70 million for facilities operation and maintenance.

Concern has been expressed by community leaders over being heavily dependent on just two major industries, particularly since gambling and weapons testing are so heavily influenced by governmental action. The future of government activities in Southern Nevada is a key factor to be considered in evaluating the economic prospects of the area.

While the civilian work force has increased about 9 percent a year over the decade, the unemployment rate has varied between a low of 3.9 percent and a high of 7.2 percent. The unemployment rate is mostly

due to the cyclical nature of the employment pattern, especially in some of the service sectors.

The service sector accounts for approximately 39 percent of all wage and salary employment in Clark County. It includes the important employment groups, including hotels and amusements, and business services which include employment at the TRC and ERDA. This category has grown at an average annual growth rate of 10 percent, which is one of the fastest growing major sectors of the Southern Nevada economy.

Tonopah is an example of a town which owes its beginning to the mining industry. The first discovery of silver in Tonopah occurred in 1900 and it triggered a bonanza that stimulated mining in the West for a decade and awoke Nevada from hard times and declining population. By 1902, the town had 3,000 inhabitants. It became the hub of railroad service for the region, and became the seat of county government. By 1907, Tonopah had become a modern mining town of more than 20,000 inhabitants. Tonopah became the outfitting point for prospectors and the distribution and supply point for new camps as they developed. Tonopah reached its peak in 1910-1914 and continued to have many good years until the Depression. Its four principle companies continued operation until World War II. In 1947 the local railroad was abandoned.

Tonopah survived the decline of mining for a number of reasons. Situated on the main highway between Reno and Carson City in the north and Las Vegas in the south, it continued as a service center for the nearby ranching and agricultural interests. During World War II, the military services constructed an airbase nearby for purpose of aircrew training. Tonopah also became a headquarters for tourists visiting the mountain deserts. The 1970 census found Tonopah with a population of 1,720 almost a third of the total population of Nye County.

Tonopah is extremely vulnerable to changes in the activities and spending policies of the Federal Government. Ninety percent of Nye County is owned by the Federal Government. Of that total, 58 percent is managed by the Bureau of Land Management, 15 percent by the Forest Service and 24 percent by "others," largel; the Department of Defense.

The dominate industry of Nye County is government, but the leading employer in the county is the service industry, accounting for 28% of the employment. A good portion of the service industry directly supports ERDA activities however. Government follows with 20% and mining is third with 14 percent.

Tourism presumably will figure very strongly in Tonopah's future. A community center has been constructed holding 400 persons and serves as a convention center for the many state organizations that like Tonopah because of its central location.

Another area that is impacted by TRC operations is the Caliente, Pioche, Panaca area north and east of Nellis Air Force Base in Lincoln County. The three towns together number about 2,100 of the county's 2,500 total population according to the 1975 listing. The largest is Caliente with a population of 960. The industry of the area consists primarily of mining, agriculture, livestock raising, and tourism.

Pioche enjoyed boom and bust periods from its beginning in about 1868. After the railroad was extended to the town in 1907, it became an attractive camp with several substantial business houses, a water system, a school, a bank, and a newspaper. In recent years it has been an outstanding producer of lead and zinc. From 1937 to 1956, the mines prospered but then declined in 1958. Since the mid-1960s, there has been increased mining activity again. More important than mining at the present time is tourism. High timbered country, fresh cool air, clean uncluttered land and nearby lakes bring more gold these days then buried ore.

Caliente is a somewhat larger town and provides some services not available in Pioche. There is a hospital, three churches, an elementary school, newspaper, municipal park, swimming pool, library, and youth center.

Panaca was, and presumably remains today, a quiet Mormon town founded by Mormon colonists in the 1860s. Its only church is Mormon. One of its chief economic pursuits is agriculture.

Like the Tonopah area, government plays a crucial role in the lives of residents of Lincoln County. Ninety-nine percent of the land is in public ownership and almost all of that is owned by the Federal Government. The Bureau of Land Management manages 82 percent of the public land. Government accounts for 38 percent of the employment in the county while trade and services account for only 13 percent and 5 percent, respectively. The latter figures are far lower than for the state of Nevada as a whole.

Lincoln County has the lowest median family income in the state. The county has been designated a redevelopment area by the Department of Commerce's Economic Development Administration. The county is therefore qualified to receive grants and low interest loans from EDA.

Agricultural Activities:

Agricultural activities are limited to a few specific areas where water is available for irrigation. In and near the vicinity of the TRC, there are only a handful of agricultural areas, as listed in Table D-3. These agricultural areas are located on lands underlying the proposed airspace training areas; none are on lands underlying the restricted airspace areas.

Grazing Activities:

Feral livestock consisting of horses and burros that have escaped the close domestic management of man now graze freely throughout much of the TRC area and may persist scattered throughout the western United States. These animals are still escaping into the wild, thus, their populations are made up of animals that have been removed from man's management practices for hundreds of years with long histories of isolation and interbreeding, and those that are essentially domestic but free-grazing.

At the present time there is a very high level of public interest in wild horses for their aesthetic appeal. There has been some concern expressed about wild horse competition with range livestock.

In recent years wild horses, and sometimes burros, have caught the attention and imagination of many North Americans; so much so that legislation has been passed to protect them (Public Law 92-195 passed in 1971).

TABLE D-3

AGRICULTURAL AREAS IN OR NEAR THE TRC,

WITH THEIR APPROXIMATE SIZE AND

PRINCIPLE CROPS

Agricultural Area	Principle Crops	Approximate Acreage
Pahrump Valley	Cotton, Alfalfa	10,000
Pahranagat Valley	Alfalfa	8,000
Lower Meadow Valley Wash (several locations)	Alfalfa	800
Sunnyside	Alfalfa, Small Grains	200
Panaca-Caliente	Alfalfa, Small Grains	12,000
Las Vegas Valley	Alfalfa, Sorghum, Raw Crops, Dairy	25,000
Moapa Valley	Alfalfa, Sorghum, Raw Crops, Dairy	3,000
Virgin Valley	Alfalfa, Small Grains, Dairy	2,400
Beaver Dam Area	Alfalfa	300
Enterprise Area	Alfalfa, Small Grains, Potatoes	18,000
Isolated Ranges Warm Springs Twin Springs Ranch Armagosa Valley Ash Meadows Stone Cabin Valley ERDA Experimental Ranch		1,500
	Total	88,380

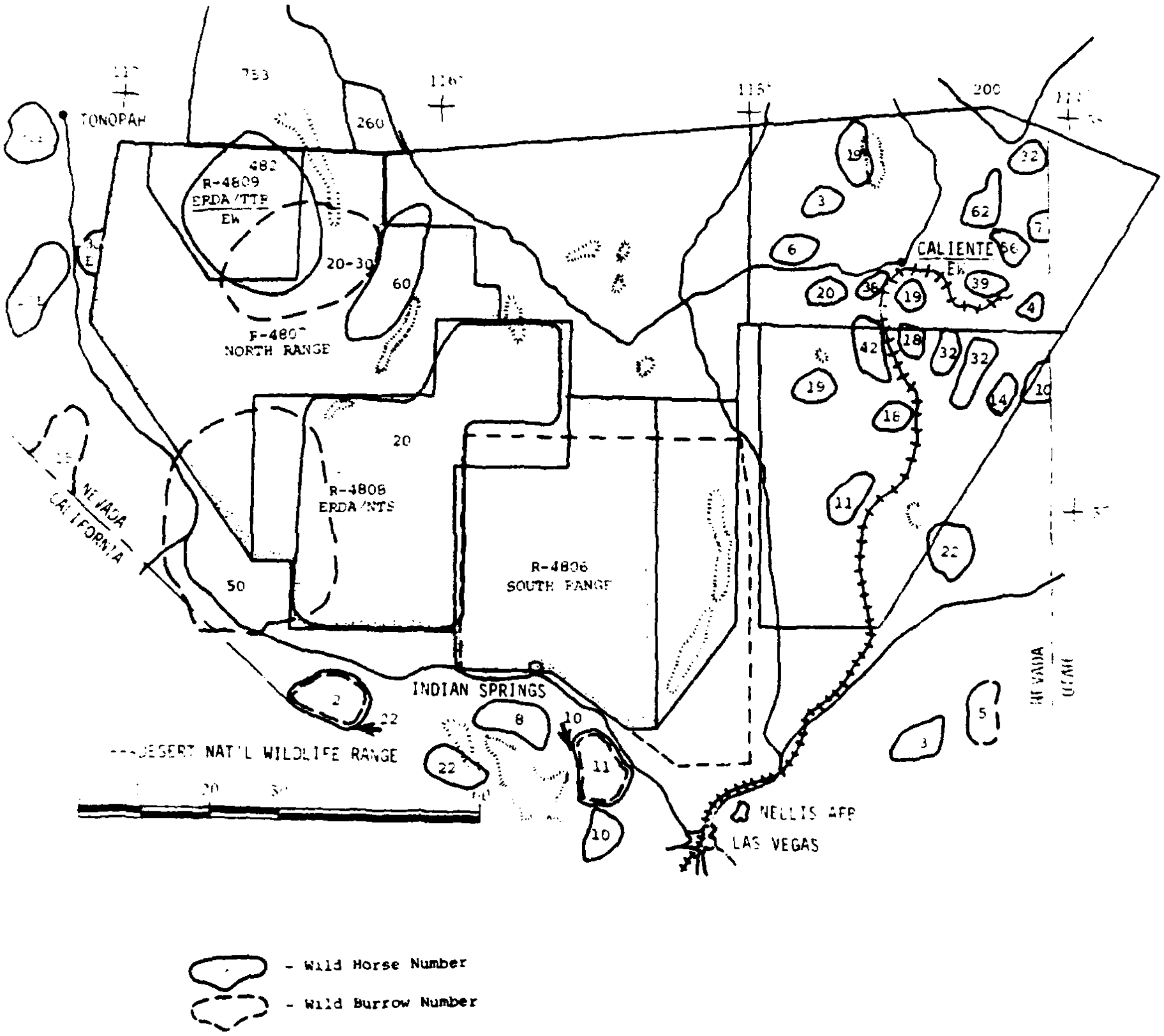
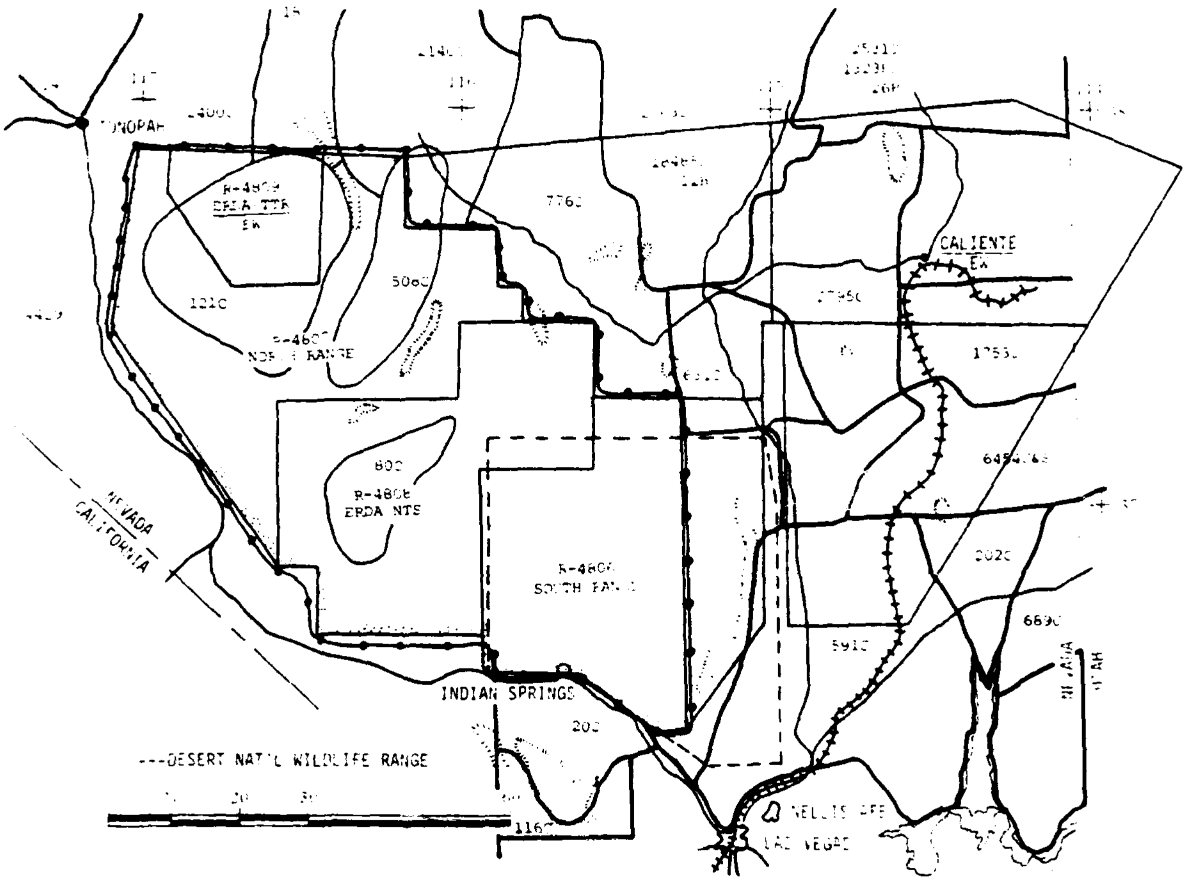


Figure D-3 - Wild Horses and Burros

There are approximately 600 wild horses and a few burros in and near the TRC area as shown in Figure D-3. Since management has not been intense, there is little known about their biology or space requirements. These animals have historically been in and near the TRC, some being associated with the BLM lands. The Wild Horse Range (now included in the vicinity of North Range) has a fair population where they have had a history of exposure to Air Force activities.

Policies for managing wild horses and burros pursuant to Public Law 92-195 observe the principles of multiple use, sustained yield and environmental quality, and are dedicated to protect them from unauthorized actions and to manage their habit in a manner to achieve and maintain an ecological balance and a population of sound, healthy individuals. An overriding management consideration is that management activities must be consistent with the free-roaming behavior of the animals coupled with the multiple use concept. Management methods will include preservation and allocation of habitat based on biological requirements, regulation of numbers, and protection from illegal taking.

Grazing ranges in the TRC area are used for livestock as winter ranges, summer ranges, and sometimes as continuous use ranges, depending on the management system. Much of the grazing is year-round where the lands are administered by the Bureau of Land Management. Figure D-4 depicts the locations of domestic livestock in the TRC area. Range land is leased on the basis of one Animal Unit Month (AUM) per designated acreage. For instance, in Nye County on Section 15 (Taylor Grazing Act) lands, the AUM is established at one per 52 acres, and grazing is year-round.



DOMESTIC LIVESTOCK

C = Cattle

S = Sheep

H = Horses

Restricted Area; No BLM Permits but There are Cattle

Figure D-4 - Domestic Livestock

Sophisticated management programs are being developed by the BLM to include additional fencing, water development, and specific turn-on, turn-off dates for rest-rotation grazing and other grazing management systems. ERDA has an experimental herd of about 80 animals on the Nevada Test Site.

Trespass cattle grazing has been and continues to be a problem in management of the TRC and ERDA lands. The Air Force, in cooperation with the BLM and ERDA, has attempted several alternative solutions to this problem but as yet it remains unresolved.

Archaeological and Historical Sites:

A preliminary survey of information concerning known or surveyed archaeological and historical sites in or near the TRC shows some basis for concern regarding archaeological values. Through the services of the Nevada State Park System, information has been provided concerning known sites of archaeological or historical value in the TRC region. Many of the known sites are related to a previous era when mining operations were the dominant activity in Nevada. The state also contains several unique natural features, and there are known prehistoric sites of significant interest.

A number of sites have been placed in the National Register of Historic Places,

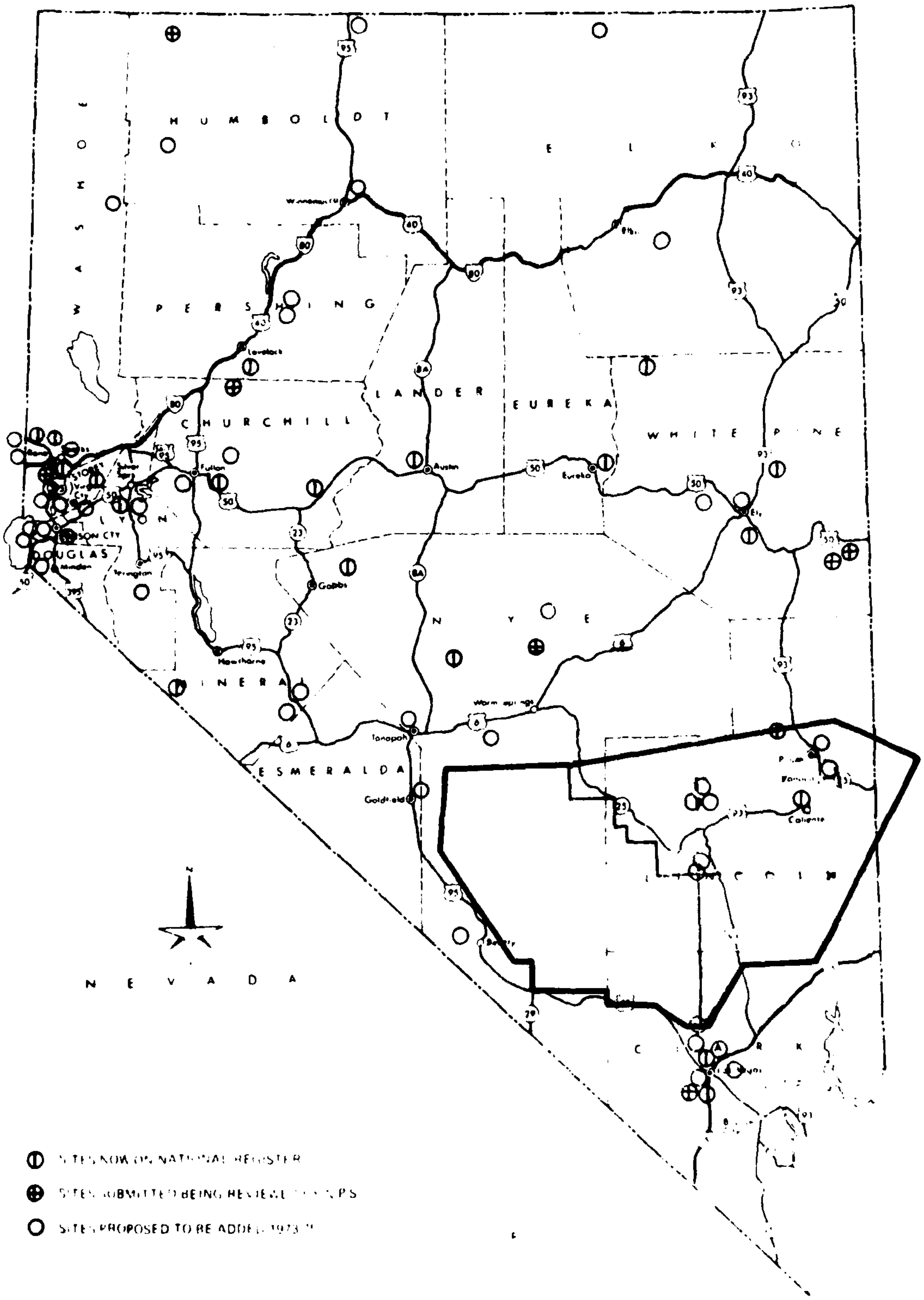


Figure D-5 - Archaeological and Historical Sites Within the TRC Region

Figure D-5 shows the approximate locations of sites which either are listed in the National Register, have been submitted and are being reviewed, or are proposed to be added. The names of these sites are listed in Tables D-4 and D-5 along with the type and date of entry. As Figure D-5 shows, none of the sites lie within the restricted land areas of the TRC. However, the absence of known archaeological or historical sites should not be construed as meaning there is nothing of historic value; instead, it very likely reflects the low level of archaeological investigations which predate the occupation of these lands by the Air Force. There is some evidence of early mining activity on the TRC lands but it is not known if any attempt has been made to assess the historical significance of any remaining artifacts. Figure D-5 does show that several sites underlie the airspace training areas of the TRC.

TABLE D-4

NEVADA ENTRIES IN THE

NATIONAL REGISTER OF HISTORIC PLACES

Name	Type of Entry	Date Entered
*Fort Ruby	Site	1961
*Leonard Rock Shelter	Archaeo. Site	1961
*Senator Newland/s Home	Site	1961
*Virginia City	District	July 1961
Austin	District	1971
Berlin	District	Nov 1971
Cold Springs	Site	Feb 1972
*Fort Churchill	Site	Dec 1966
Grimes Point	Archaeo. Site	Feb 1973
Las Vegas Mormon Fort	Site	Feb 1972
Schellbourne	Site	Feb 1972
Ward Charcoal Ovens	Site	Feb 1972
Bristol Wells	District	Mar 1972
Belmont	District	June 1972
Lake Mansion	Site	June 1972
Eureka	District	Apr 1973
V&T Locomotives	Objects	Jan 1974
Caliente R.R. Depot	Site	Mar 1974
Morrill Hall	Site	May 1974
Aurora	District	July 1974
Winters Ranch	Site	July 1974
Big Springs	Site	Sept 1972/Dec 1973
Potoshi	District	June 1972
State Capitol	Site	Feb 1974
Last Supper Cave	Site	Feb 1974
Flagg House	Site	Sept 1974

*National Historic Landmark

Name (and Agency)	Date Arrived	Sent to Review Comm.	SHPO** Sign & Return to Agency
USF&W			
Black Canyon Petroglyphs	7-9-74		
Walden, Fred, Stone House	7-9-74		
No. Las Vegas Bicentennial Com.	7-15-74		

OTHER NOMINATIONS:

Derby Dam	First Flight in Nevada
Blue Diamond Adobe	Crib Area in Ely
Fort Halleck	Bowers Mansion
	Gypsum Cave

**State Historical Preservation Officer

TABLE D-5

NEVADA SITES SUBMITTED OR NOMINATED

FOR THE NATIONAL REGISTER OF HISTORIC PLACES

Name (and Agency)	Date Arrived	Sent to Review Comm.	SHPO** Sign & Return to Agency
Rhodes Cabin (NPS)	3-5-74	3-12-74	2-74
Lehman Orchard & Aqueduct	3-5-74	3-12-74	returned to NPS (west region) 7-3-74
Humboldt Cave	3-7-74	3-12-74	returned to BLM
James Wild Horse Trap	3-7-74	3-12-74	7-2-74
Longstreets Ranch	3-7-74	3-12-74	
Tybo Charcoal Ovens	3-7-74	3-12-74	
Glendale School	3-14-74	4-11-74	
Stewart-Nye Residence	2-22-74	4-11-74	
Pioche Courthouse	2-28-74	4-11-74	
Goldfield Historic District	2-28-74	4-11-74	
V&T Shop Building	3-14-74	4-11-74	
Tule Springs	3-14-74	4-11-74	
Walleye Hot Springs	3-26-74	4-11-74	
Lakeview House	3-29-74	4-11-74	
Flying Me Ranch	4-3-74	4-11-74	
Steamboat Springs	3-27-74	4-11-74	
Sutro	4-3-74	4-11-74	
Nixon Hall	4-3-74	4-11-74	
Desert Nat'l Wildlife Range	5-16-74	5-20-74	
1. Mesquite House	5-16-74	5-20-74	6-18-74
2. Blacksmith Shop	5-16-74	5-20-74	
3. Mormon Well Corral	5-16-74	5-20-74	
4. Corn Creek Campsite	5-16-74	5-20-74	
5. Hidden Forest Cabin	5-16-74	5-20-74	
6. Pintwater Cave	5-16-74	5-20-74	
7. Sheep Mountain Range	5-16-74	5-20-74	
8. Tim Springs Petroglyphs	5-16-74	5-20-74	
U.S. Sport Fisheries & Wildlife Stillwater Refuge	6-12-74	6-17-74	8-16-74
BLM - State Office			
White River Arch. Site	6-25-74		
Mt. Irish Arch. Site	6-25-74		

Air Quality:

The Clean Air Act as amended gives the Environmental Protection Agency (EPA) the authority for setting standards and emission criteria. The EPA sets maximum allowable limits for pollutants contributing to the ambient air. These limits are expressed as primary and secondary air quality standards. The primary ambient air standards are those which the EPA Administrator deems necessary to protect the public health. The secondary standards are maximum levels necessary to protect public welfare from known adverse effects of a particular pollutant. The latter protect against effects on soil, water, vegetation, materials, animals, weather, visibility, personal comfort and well being.

These guidelines are not intended to allow any deterioration of a state's existing air quality. A state may promulgate and enforce standards more stringent than national standards to protect existing air quality.

The EPA sets air quality standards and emission criteria for fixed and mobile sources of pollution. With these standards the states, or subdivisions of states, such as counties or cities, enforce the standards. The states, through "implementation plans," provide for a control strategy which will provide for the degree of emission reduction necessary for attainment and maintenance of the national standard, including the degree of emission reduction necessary to offset emission increases expected to result from population growth, industrial activity, motor vehicle traffic, or other factors that may increase emissions.

Under the law, state implementation plans must control emissions enough to meet the primary standards for the six major air pollutants (sulfur oxides, nitrogen oxides, particulate matter, carbon dioxide, hydrocarbons, and oxidants) by mid-1975 or earlier. An Air Quality Implementation Plan (30 January 1972) was developed for the state of Nevada to maintain air quality compliance with federally promulgated standards.

The Great Basin generally enjoys excellent air quality, owing primarily to its sparse population. Only in urban centers, such as Las Vegas, is there noticeable deterioration in air quality. This is generally borne out by Table D-6. Although the State Implementation Plan (SIP) contains emission data for only particulates and sulfur dioxide for Nye and Lincoln counties, it shows that these emissions for these two counties are much less than the same pollutants emissions in 1970 for Clark County, and indicates that air quality standards are not being exceeded in Lincoln and Nye counties. As a large portion of the TRC is within Nye and Lincoln counties (Figure D-1), it seems that Air Force activities at the ranges have not resulted in pollutant emission quantities that would exceed the established air quality standards.

The SIP indicates that air pollutant emissions in Clark County must be reduced in order to attain the established air quality standards. The quantities that the SIP projected these emissions would have to be reduced to in 1975 in order to attain the air quality standards are shown in Table D-6 (1975(desired)). Unpublished data provided by the Clark County District

TABLE D-6

AIR POLLUTANT EMISSIONS, 1970 AND 1975
(Tons/Year)

County	YEAR	Pollutants				
		Part	SO_2	HC	CO	NO_x
Clark	1970(Reported)[1]	89,000	55,800	47,300	160,000	83,400
Clark	1975(Reported)[2]	31,950	33,411	21,916	123,712	69,708
Clark	1975(Desired)[1]	13,114	-	18,254	83,092	76,764
Nye	1970(Reported)[1]	1,506	535			
Lincoln	1970(Reported)[1]	251	193			

1. Source: Air Quality Implementation Plan for the State of Nevada, 30 Jan 72, Commission of Environmental Protection, State of Nevada.

2. Source: Clark County District Board of Health, 1975 Unpublished Data.

Board of Health for calculated emission quantities for Clark County in 1975 are also contained in this table for comparison (1975(Reported)).

Table D-6 reflects that emissions of all five air pollutants were reduced from 1970 to 1975 in Clark County. Of the four pollutants for which the SIP indicated reductions were required, only nitrous oxide emissions for 1975 were less than the projected amounts necessary to attain air quality standards. The 1975 emissions of particulates, hydrocarbons, and carbon monoxide exceeded the projected allowable emissions, according to the data provided.

The term air quality refers to the concentration of pollutants in the ambient air in an area. Relative air quality is generally indicated by comparison of observed (measured) pollutant concentrations with established federal or local air quality standards. The air quality at a particular location is dependent on the degree to which all of the pollutant sources in the vicinity, including natural sources, contribute to pollutant concentrations at that location.

Monitoring stations, which measure air pollutant concentrations at that location are located in and around Las Vegas. Air pollutant concentrations recorded by these monitoring stations during 1975 are presented in Table D-7. Primary and secondary air quality standards are also presented in this table for comparison, which would be an indication of the relative air quality in the Las Vegas area.

The data in Table D-7 indicates that sulfur dioxide and nitrogen oxide concentrations did not exceed the air quality standards during 1975.

However, the annual mean and 24 hour maximum measurements of particulates, the hourly maximum measurement of oxidants, and the eight hour mean measurements of carbon monoxide all exceeded the air quality standards. Photochemical oxidants are created in the atmosphere by the action of sunlight on unburned hydrocarbons. These conclusions seem to confirm that for those pollutants whose calculated emissions exceeded the projected allowable emission quantities in 1975 (Table D-6) the air quality standards were not attained.

Table D-7 does reflect that the measured concentrations of particulates at the Nellis AFB monitoring station did not exceed the annual mean air quality standards, although it did exceed the 24 hour maximum standards. This data includes windy days causing dust to be blown into the air, which was the probable cause of these high 24 hour measurements.

The effect of Air Force operations on the area air quality is discussed in Section 3D.

TABLE D-7

1975 MEASURED AIR POLLUTANT CONCENTRATIONS

(Micrograms/m^3)

Air Quality Monitor Site	Particulates Annual Mean	Particulates 24-Hour Max	SO_2 Annual Mean	SO_2 1-Hour Max	Oxidant Annual Mean	Oxidant 1-Hour Max	CO 8-Hour Mean	CO 1-Hour Max	NO_2 Annual Mean	NO_2 1-Hour Max
AQCR 13										
Clark Cty. Health Dept.	95	778								
Nellis AFB	59	672								
L. V. Fire District #1	87	451					14.7	20.9	37	
L. V. Fire District #2	114	830	6.7	119		425	25.4	35.7		
NLV Fire District	122	788								
McCarran AP	78	883								
Primary Standard	75	260	80	365		160	10mg/M^3	40mg/M^3	100	
Secondary Standard	60	150	60	260					100	

*Source: Clark County District Board of Health, 1975 Unpublished Data.

Natural Environment:

Physiography of the Great Basin: The TRC area lies wholly within the Great Basin Section of the Basin and Range Physiographic Province. The Great Basin, which covers all of Nevada and portions of California, Utah, and Idaho, consists typically of north-south trending mountain ranges separated by valleys, many of which are basins with internal drainage. Elevations vary from below sea level in Death Valley to over 13,000 feet on Boundary and Wheeler Peaks in Nevada. Basin floors are found at elevations above 6,000 feet, but average nearer 4,000 feet. There are more than 200 mountain ranges in the Province, about 21 of which are found in Utah and 52 in Nevada.

The Great Basin is divided into five subdivisions based on their structure, topography, hydrography and kind of soil and soil substrate:

1. The Central Area of elevated basins and ranges (part is included in the TRC area).

2. The Bonneville Basin east of the Central Area (not included in the TRC area).

3. The Lahontan Basin west of the Central Area (not included in the TRC area).

4. The Lava and Lake Area (not included in the TRC area).

5. The Southern Area (in the TRC area).

The eastern and northern parts of the Central Area contain linear mountain ranges of completely deformed Paleozoic rocks consisting in

large part of limestone. To the west, the rocks are mostly sandstone, saltstone, and shale derived from volcanic rocks. Block faulting of those folded and faulted rocks produced the basins and ranges. Many small, relatively fresh fault scarps from a few inches to 40 feet in height are found throughout the Great Basin.

The Southern Area is structurally similar to the Central Area but is lower. Rocks forming the mountain ranges include complex, folded and faulted Paleozoic and Precambrian rocks, some small masses of equally deformed Triassic and Jurassic rocks, granitic intrusions related to the Sierra Nevada batholith, and a thick series of Tertiary and Quarternary volcanics. This period was preceded by folding and thrust faulting of an original Paleozoic geosyncline in early, middle and late Mesozoic. Middle and late Cenozoic block faulting later produced sediments deposited in the basins leaving the Great Basin as it is today. In some basins, the fill is enormously thick. Death Valley, for example, is estimated to contain 8,000 feet of fill having been downfaulted nearly two miles below sea level and then filled with sediment.

The Great Basin is undergoing considerable earth movement (structured deformation) at the present time. Numerous earthquake epicenters are found throughout the Great Basin including the TRC area. There is a concentration of epicenters along the western and eastern parts of the Great Basin, and a few are distributed across its north and

south borders, although few epicenters have been recorded in the interior of the Basin. The frequency of recent fault scarps is related to the frequency of earthquake epicenters.

The Great Basin Province, as a whole, is the driest in the United States. It is so arid that there is a scarcity of perennial rivers/streams. Evaporation rates are high, normally greater then 100 inches per year.

Weather in the Great Basin is the result of three prevailing circulation patterns; transitory frontal systems moving inland from the Pacific and controlled to a certain extent by the jet stream, continental cyclones developing over the Great Basin, and convection associated with moist air from the Gulf of Mexico. The last two operate year-round, while the first is confined to the summer season. It should be noted that an important feature of the climate in this region is the existence of a semi-permanent high pressure area. It is this feature which primarily accounts for the good flying weather but it also offers significant potential for air pollution. Precipitation comes with great seasonal variation in strength and frequency, thus reliable precipitation for plant growth and other uses does not occur in the Great Basin. Precipitation is lightest in the low basins of the south (0.5 to 4.0 inches per year), and in west-central Nevada and western Utah (four to six inches per year). The dry area in the south stems from the rarity of cyclones, while the area to the north occupies rain shadows to the lee of the high mountains.

In the Pleistocene era, the Great Basin was not desert but rather, as the climate was wet enough, supported lakes hundreds of feet deep. Only a few remnants of these lakes remain (e.g. Great Salt Lake and Pyramid Lake). Other lakes are dry playas or only intermittently wet. The distribution of Pleistocene Lakes is closely correlated with the contemporary Salt Desert shrub vegetation.

Major Biotic Communities:

The numerous and diverse mountain ranges and their respective valleys have provided for the development of a rather diverse flora and fauna, often changing with sharp ecotones as elevations change or from valley to valley; but generally, the communities can be characterized as (1) Southern Desert shrub, (2) Salt Desert shrub, (3) Northern Desert shrub, (4) Pinon-Juniper woodland, (5) mountain brush, (6) forest, (7) grasslands, (8) Hydrophilous vegetation, and (9) croplands. A complete listing of the species considered in this work is found in Appendix A where plants, mammals, birds, reptiles, amphibians, and fish are listed with their respective common names.

The vertebrates are listed as to whether they are residents of the TRC area and, if so, if it includes all or part of the species' geographic range. This partitioning is particularly helpful in assessing the possible impact on a species, since the risk increases rapidly as the percentage of a species' range increases in the TRC.

If a species, such as the white footed-mouse, overlaps essentially all of the TRC, it would not be too serious since it is also found over most of the rest of temperate North America. On the other hand, some risk to such animals as the chipmunk (subspecies Nevadensis) exists, since its entire geographic range is restricted to the Sheep Mountains, which are within the boundaries of the TRC. Plants listed in Appendix A are limited to those species of particular interest to this FES. A comprehensive listing would be too voluminous (approximately 6,000 species) to be useful; also, most species will be impacted only as a secondary response to adjustments by other species in the food chain.

1. Southern Desert Shrub (Figure D-6): These communities are found at low elevations, primarily below 4,000 feet in the southern quarter of Nevada. The following plant species are among those which characterize these communities: Cheosote bush, Blackbush, Bursage, Box thorn, Joshua tree, Mojave yucca, Spanish bayonet, Prickly Pear cactus, Desert needlegrass, Big Galleta. Animal species commonly associated with these communities are: Merriam kangaroo rat, Chisel-toothed kangaroo rat, least pocket mouse, Long-tailed pocket mouse, White-footed deer mouse, Southern grasshopper mouse, Kit fox, Desert tortoise, Zebra-trailed lizard, Leopard lizard, Side-blotched lizard, Gopher snake, Sidewinder, Whip-tailed lizard, Black-throated sparrow, Horned lark, Loggerhead shrike, Gray flycatcher, Lecont's thrasher, sage sparrow, and Raven.

2. Salt Desert (Figure D-7): These plant communities are found primarily in valley bottoms of central and northern Nevada.

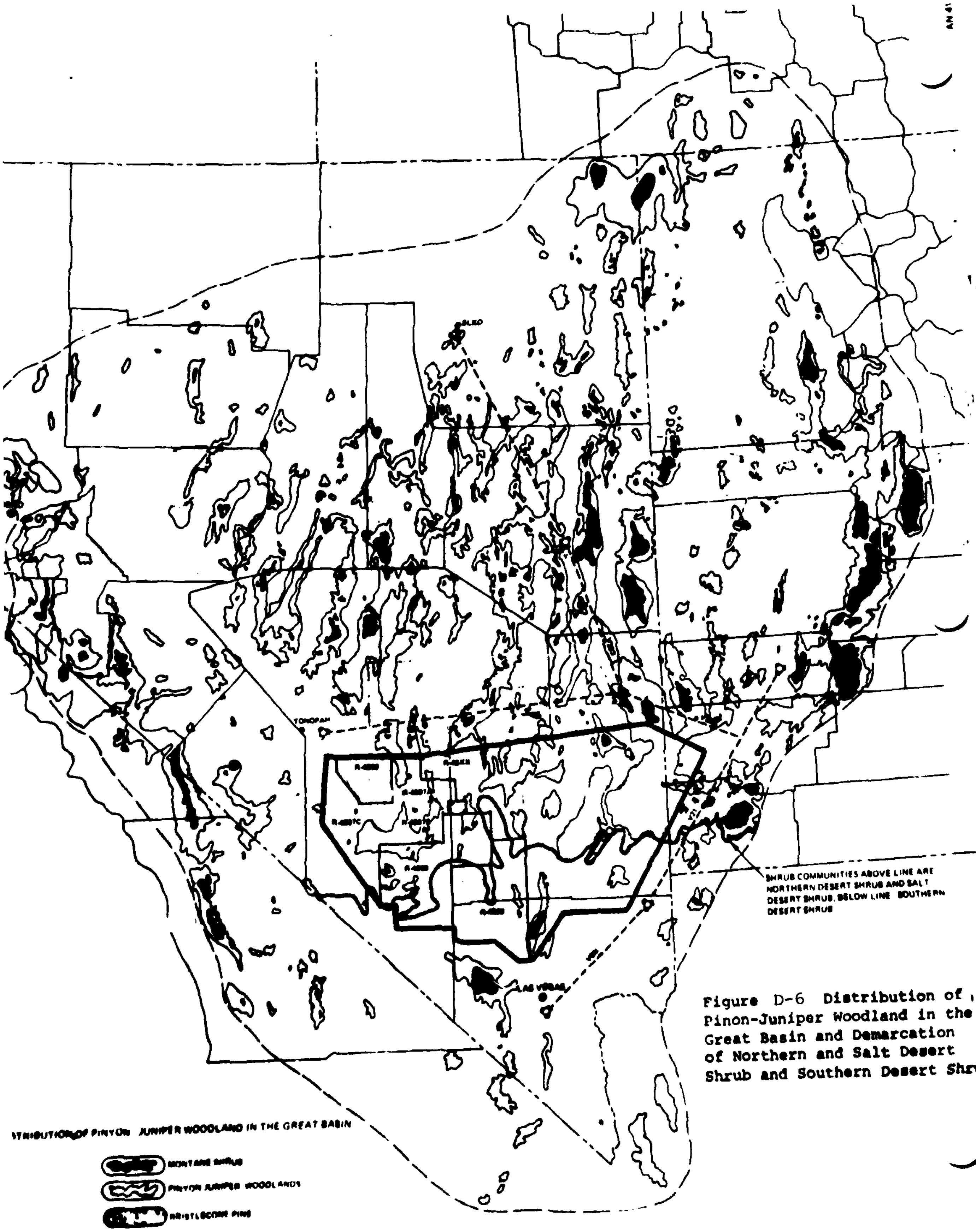


Figure D-6 Distribution of Pinon-Juniper Woodland in the Great Basin and Demarcation of Northern and Salt Desert Shrub and Southern Desert Shrub

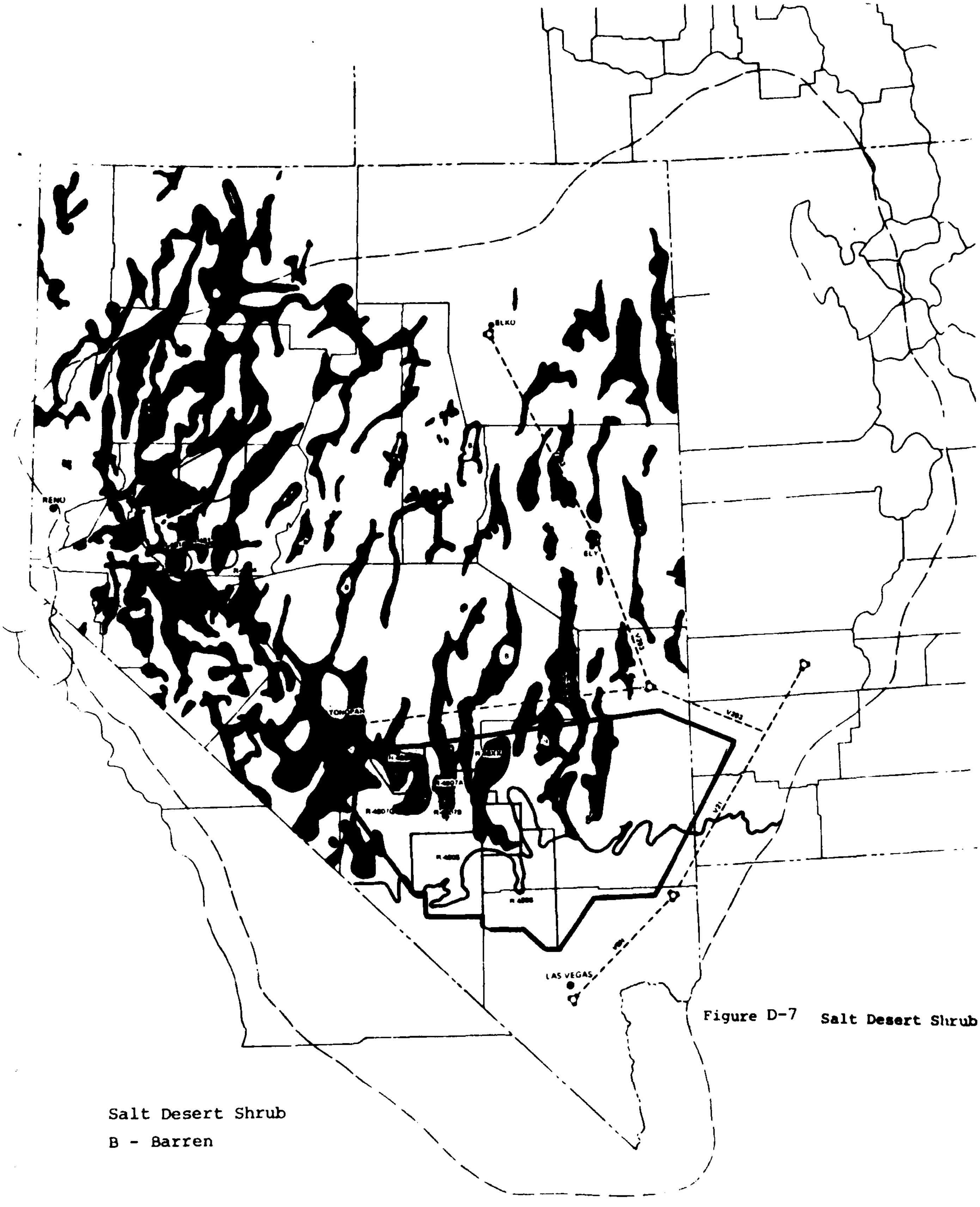


Figure D-7 Salt Desert Shrub

The following plant species are common in the communities: White-sage, Shad-scale, Four-wing saltbrush, Bailey's greasewood, Greasewood, Spiny hopsage, Russion thistle, Indian ricegrass, Black sagebrush, and Bud sagebrush. Common animal species are: Chisel-toothed kangaroo rat, Ord kangaroo rat, Least pocket mouse, Dark kangaroo mouse, White-footed deer mouse, Kit fox, badger, bobcat, coyote, Desert-horned lizard, Side-blotched lizard, Whip-tailed lizard, Speckled rattlesnake, Horned lark, Sage thrasher, Brewer's sparrow, Vesper sparrow, and Mourning dove.

3. Northern Desert Shrub (Figure D-8): These communities are found at intermediate to high elevations through Nevada. In nearly every case, a member of the genus Artemisia is dominant. Important plant species include: Big sagebrush, Rubber rabbitbrush, Green rabbitbrush, Blue-bunch wheatgrass, Squirrel tail, and Nevada bluegrass. Common animal species are: Black-tailed jackrabbit, Cliff chipmunk, Great Basin pocket mouse, Ord kangaroo rat, Chisel-toothed kangaroo rat, Western harvest mouse, White-footed deer mouse, Northern grasshopper mouse, coyote, Kit fox, bobcat, American prong-horn, Sagebrush lizard, Side-blotched lizard, gophersnake, Speckled rattlesnake, Golden eagle, Sage grouse, Horned lark, Raven, Sage thrasher, and Lark sparrow.

4. Pinion-Juniper Woodland (Figure D-6): This community is normally found above the northern desert shrub in a belt around many of the mountain ranges, primarily in central, eastern and south-eastern portions of Nevada. The two principle plant species are Pinon pine and Utah juniper. Common animal species are: Audubon cottontail,

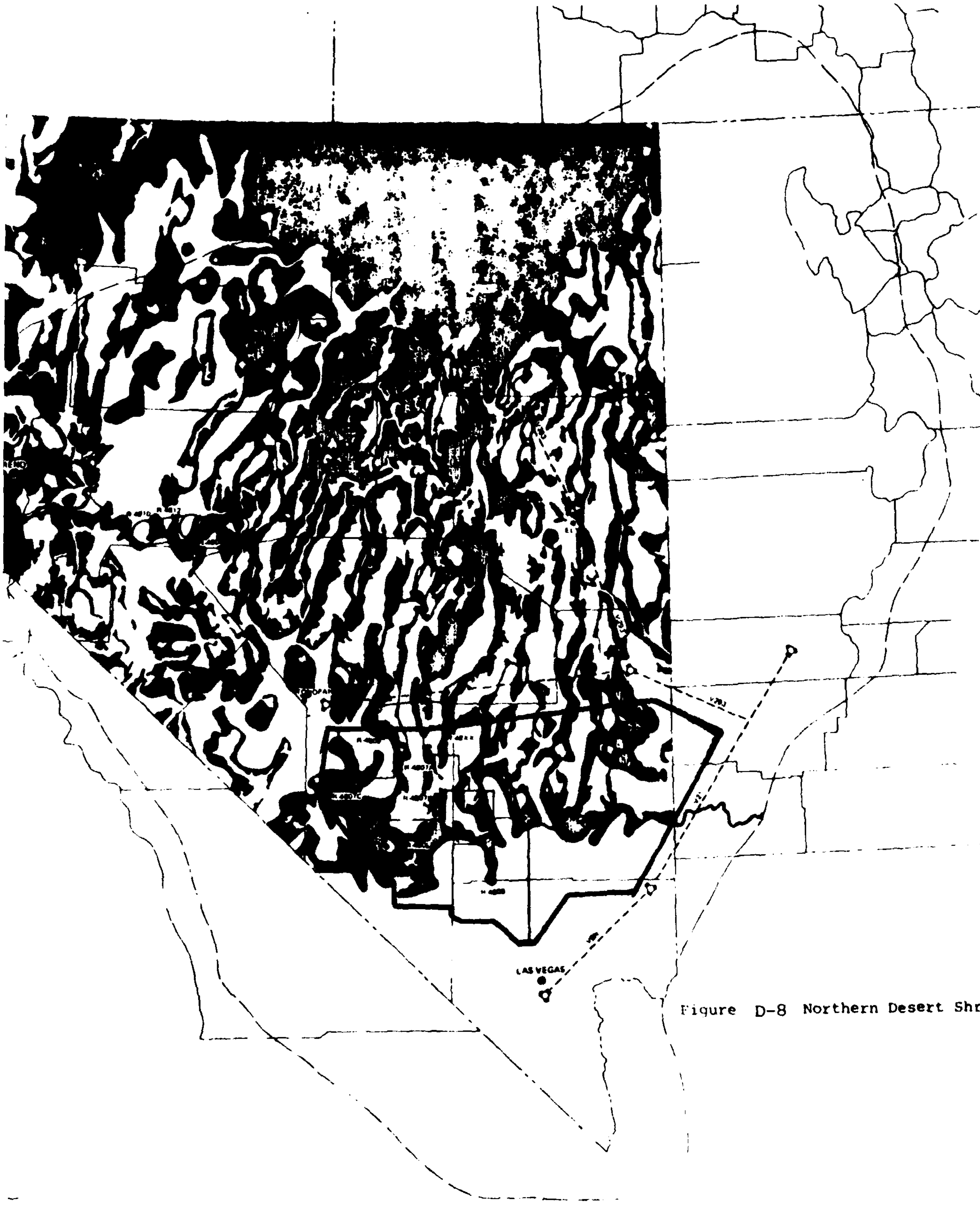


Figure D-8 Northern Desert Shrub

Ord kangaroo rat, Canyon mouse, White-footed deer mouse, Pinon mouse, Desert wood rat, coyote, bobcat, mule deer, Western fence lizard, Side-blotched lizard, Speckled rattlesnake, Mourning dove, Dusky flycatcher, Mountain chickadee, Bushtit, Gray vireo, Black-throated gray warbler, Black-throated sparrow, White-breasted nuthatch, Bewick's wren, and Poor-will.

5. Mountain Brush (Figure D-6): These communities are found at elevations mostly above the Pinon-Juniper Woodland communities, or often in close association with them. The principle plant species are: Gambel's oak, Scrub oak, Snowberry, Serviceberry, Antelope bitterbrush, Desert bitterbrush, Sagebrush species, and Quaking aspen. Common animal species are similar to those included in the Pinon-Juniper Woodland; but as yet, they are not specifically characterized.

6. Forest (Figure D-9): Truly forested sites, other than Pinon-Juniper woodlands, are rather uncommon within the "Basin and Range Physiographic Province," but the following plant species do form small, sometimes dense stands in some ranges: Bristlecone pine, Yellow pine, Whitebark pine, White fir, Limber pine, Engleman spruce, and Quaking aspen. Although the animal species associated with these localized forests are not well-established, they may be considered rather similar to what would be expected in the Pinon-Juniper woodland. Some vertebrates are, however, restricted to this plant association, such as the birds, Pygmy nuthatch and Steller's jay.

7. Grasslands: Grasses are generally present throughout the TRC area, but they are seldom found in pure stands. There are,

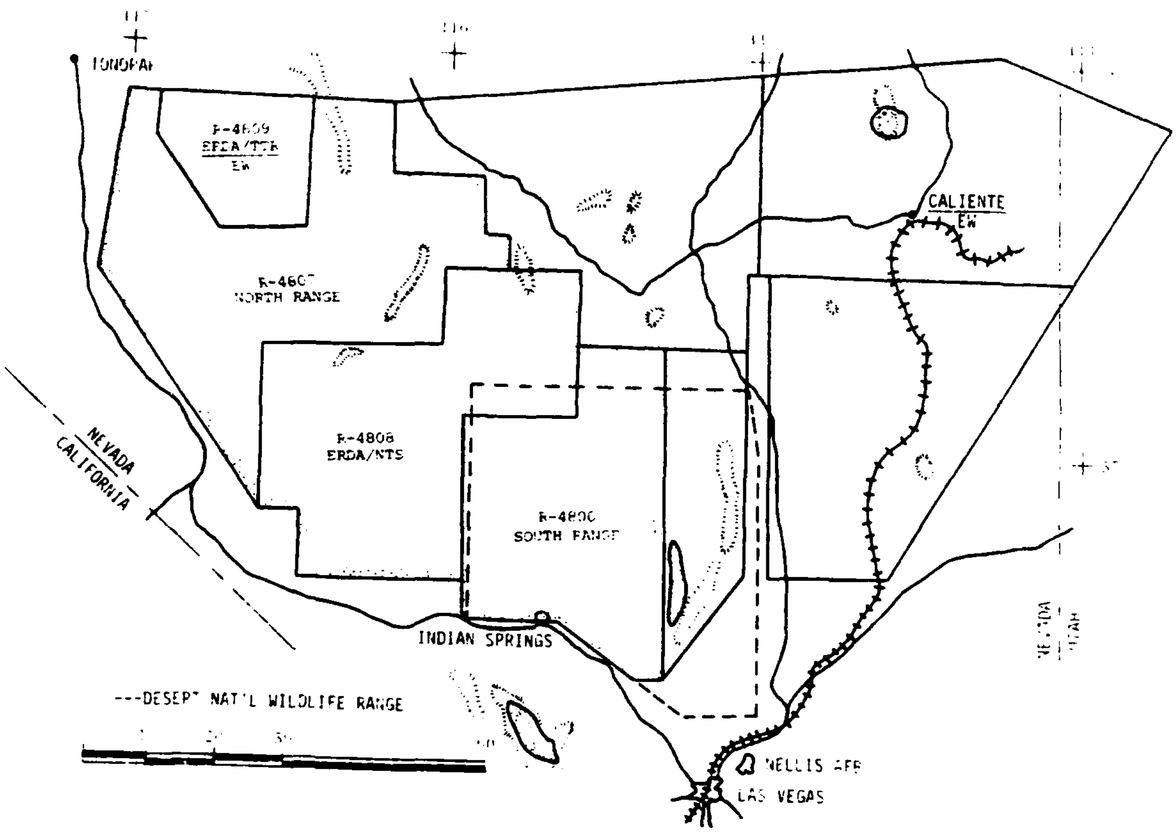


Figure D -9 - Distribution of Bristlecone Pine

however, some areas of nearly pure stands of: Nevada bluegrass, Big Galleta, Needle-and-threat grass, Saltgrass, Great Basin Wildrye, Bluebunch wheatgrass, and Indian ricegrass. In addition to the naturally occurring stands, almost one million acres have been seeded to wheat grasses for grazing purposes and several hundred thousand acres are covered with Cheatgrass, an exotic fire type. Since these grasslands are generally established locally within other vegetative types, it is not generally possible to characterize the animals associated with them. Generally, the animal species will be similar to those found in the dominant vegetation type that the grass is associated with.

8. Hydrophilous Vegetation: Wherever water (rivers, lakes, seepages, etc.) surfaces or approaches the surface, the vegetation changes dramatically from the surrounding environments. These riparian environments include all of the meadows, marshlands, stream-side and lakeside vegetation, as well as plants growing in soils where the water table is very close to the surface. Because of the local nature of these environments, the animals are difficult to characterize generally, although some species can be expected; such as the Audubon cottontail, Cactus mouse, Montane meadow mouse, Striped skunk, horse, burrow, varied amphibians, Western gartersnake, various fish, various herons and ibises, Common snipe, Yellow-throat, Yellow-headed blackbird, Red-winged blackbird, and Long-billed marsh wren.

9. Croplands: In addition to the biotic communities briefly characterized, many of which have been altered by man's activities, there are numerous established agricultural operations.

These vary in type, although most are related rather closely with cattle industry which uses mostly alfalfa. Ranches of this type are found throughout the Great Basin area and, in each case, the fauna and flora present is a matter of what the rancher will allow to develop.

Important Species:

Several species judged to be of primary importance to this assessment have been checklisted. These include those that require special attention by scientists and federal agencies because they are either endangered, threatened, or of economic or recreational value. The reasons for their special consideration are many, namely: (1) ranges are small and thus the population is restricted, perhaps only a few hundred individuals of an entire species in some cases; (2) ranges may be small and although populations may be numerically large, the entire range lies within the TRC; (3) irrespective of population numbers or range; little is known of the current status and in some cases, information suggests that populations are declining; (4) species are sensitive to molestation and may potentially be in danger of abnormal declines; (5) species are relict or may have aesthetic and scientific value; (6) economic or recreational importance; and (7) various combinations of the above. The species and why they are considered special are as follows. It is to be noted that only three of the species checklisted are actually listed on the endangered species list as compiled by the Department of the Interior and published in the Federal Register.

MAMMALS (Figures D-10, D-11, D-12)

1. Eutamias umbrinus nevadensis (Say Chipmunk) - restricted range.

2. Thomomys umbrinus nanus (Botta Pocket Gopher) - restricted range.

3. Thomomys umbrinus phelleocus (Botta Pocket Gopher) - restricted range.

4. Microdipodops megacephalus albiventer (Dark Kangaroo Mouse) - restricted range.

5. Microdipodops megacephalus sabulonis (Dark Kangaroo Mouse) - restricted range.

6. Microdipodops pallidus ruficollaris (Pallid Kangaroo Mouse) - restricted range.

7. Microdipodops pallidus purus (Pallis Kangaroo Mouse) - restricted range.

8. Microtus montanus fucosus (Montane Meadow Mouse) - restricted range.

BIRDS

1. Mycteria americana (Wood Ibis) - population status is undetermined.

2. Plegadis chihi (White-faced Ibis) - population status is undetermined.

3. Olor buccinator (Trumpeter Swan) - restricted range.

4. Buteo regalis (Furriginous Hawk) - population status is undetermined.

5. Aquila chrysaetos canadensis (Golden Eagle) - public interest.

6. Haliaestus leucocephalus (Bald Eagle) - public interest and the population is threatened.

7. Pandion haliaetus (Osprey) - public interest and the population status is undetermined.

8. Falco mexicanus (Prairie Falcon) - population status is undetermined and threatened (in part).

9. Falco peregrinus anatum* (Pergrine Falcon) - population status is undetermined and threatened.

10. Charadrius alexandrinus nivosuse (Snowy Plover) - population status is undetermined.

11. Numenius americanus (Long-billed Curlew) - population status is undetermined.

12. Speotyto cunicularia hypogaea (Burrowing Owl) - population status is undetermined.

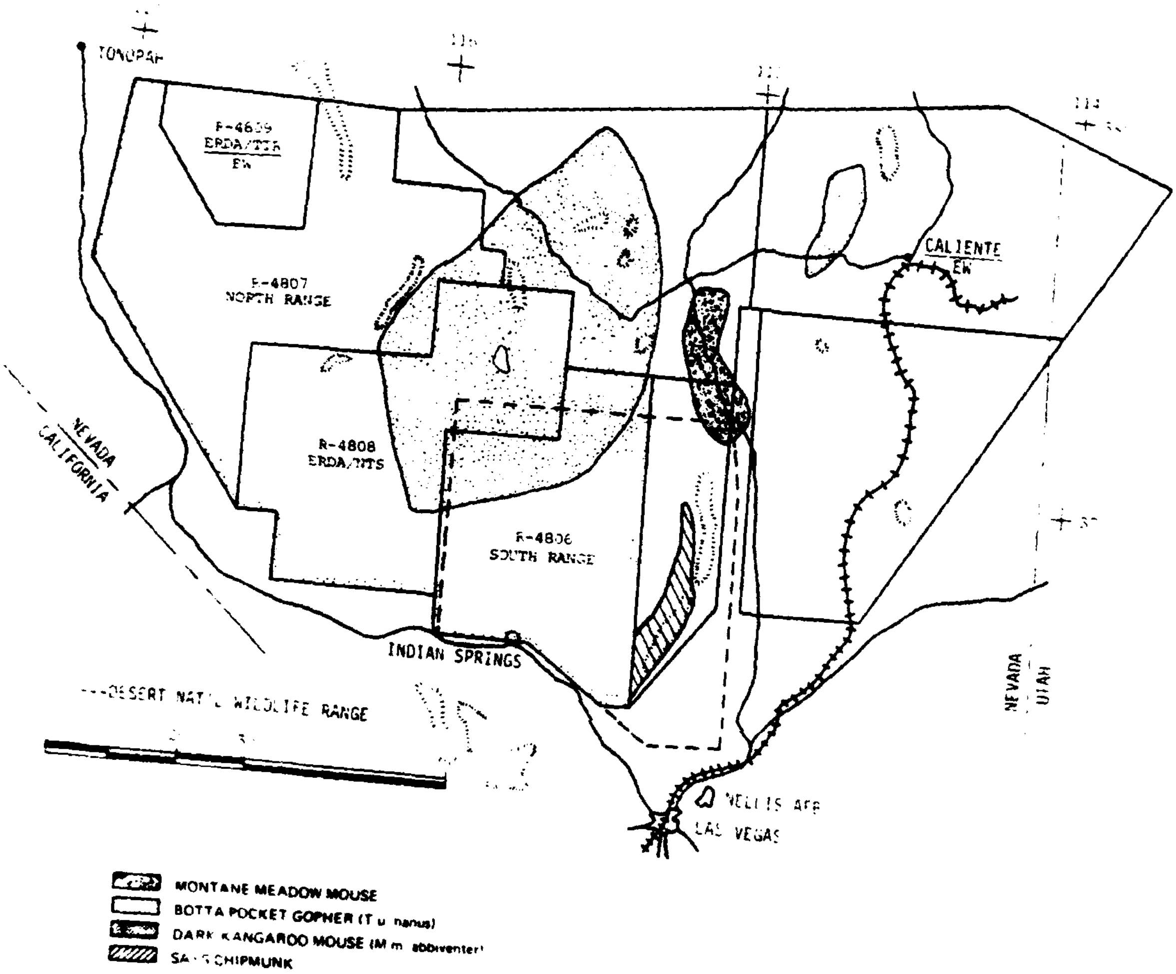


Figure D-10 - Distribution of the Montane Meadow Mouse, Botta Pocket Gopher, Dark Kangaroo Mouse, and Say Chipmunk

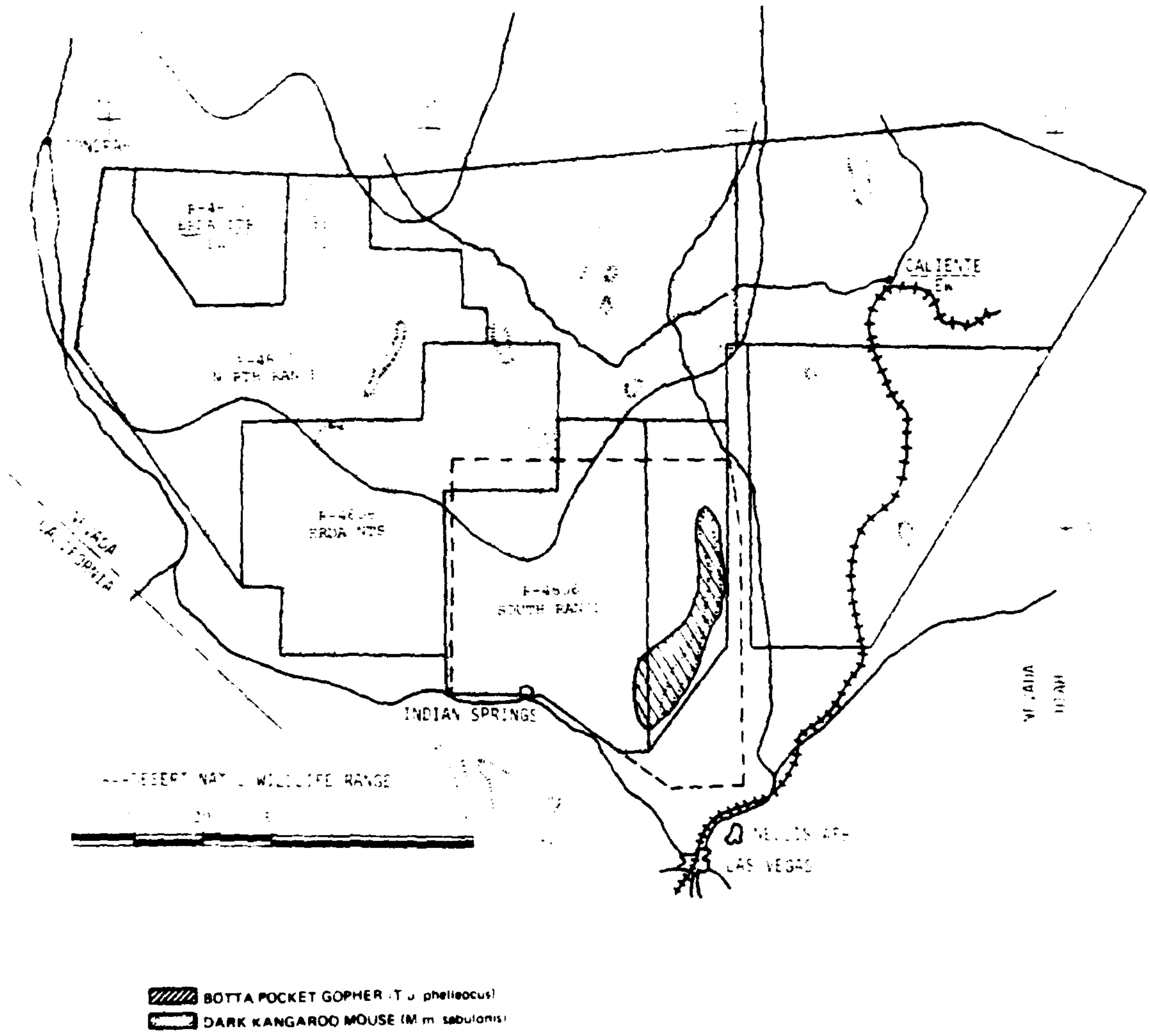
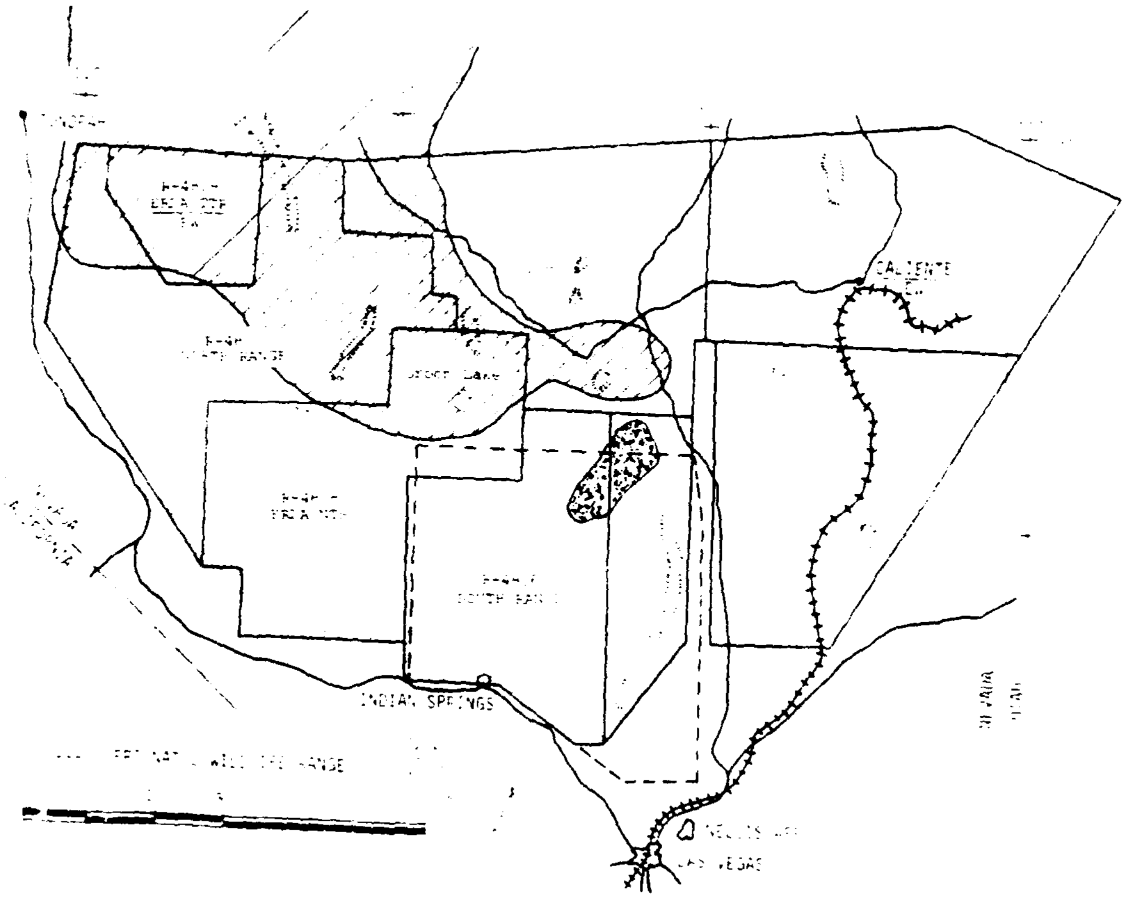


Figure C-11 - Distribution of the Botta Pocket Gopher and Dark Kangaroo Mouse



PALLID KANGAROO MOUSE (M. p. ruficollaris)
PALLID KANGAROO MOUSE (M. p. purus)

Figure 1-12 - Distribution of the Pallid Kangaroo Mice

FISH (Figures D-13, D-14)

1. Gila robusta jordani* (White River Gila) - population is threatened and with a restricte range.

2. Moapa coriacea* (Moapa Dace) - population is threatened and with a restricted range.

3. Lepidomeda albivallis (White River Spinedace) - population status is undetermined.

4. Lepidomeda altivelis (Pahranagat Spinedace) - restricted range.

5. Crenichthys baileyi (White River Springfish) - restricted range with local endemic populations.

6. Crenichthys nevadae (Railroad Valley Springfish) - restricted range.

*Endangered species, 16 U.S.C. 668aa, Appendix D.

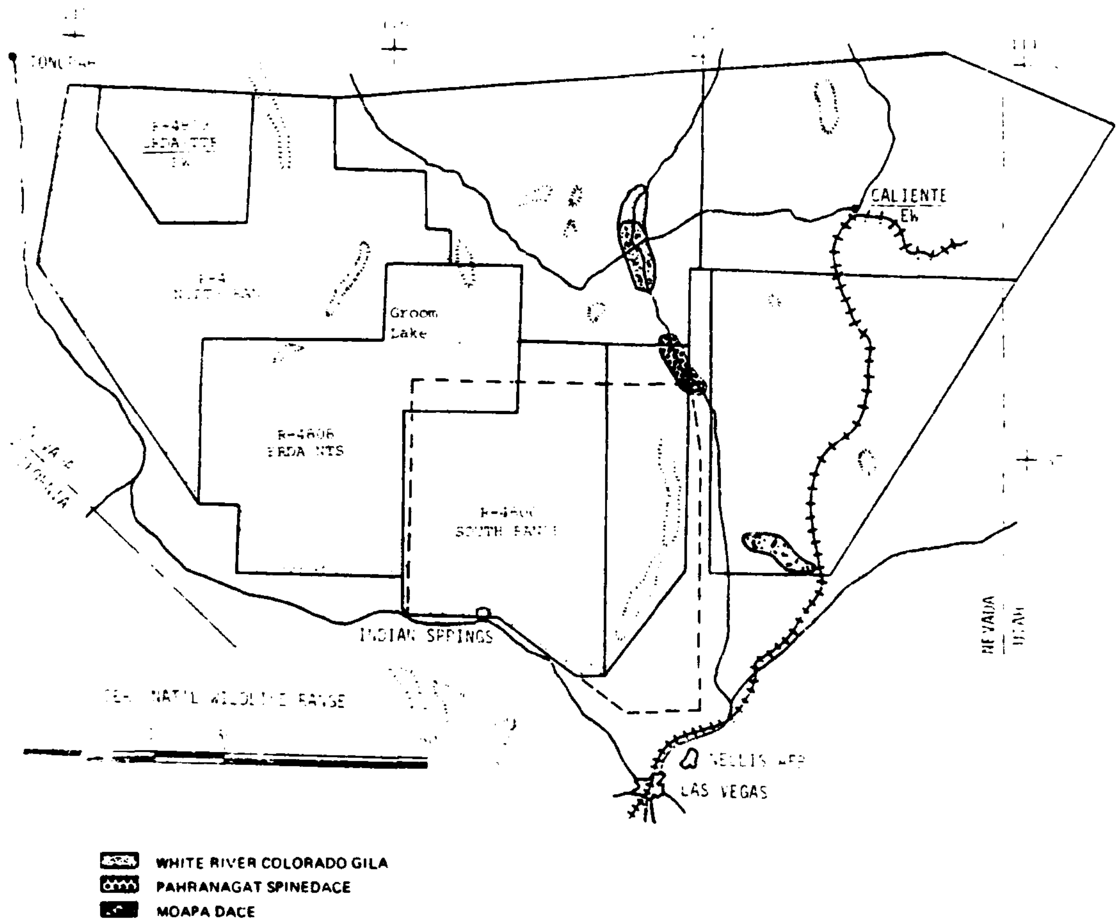


Figure D-1[illegible] - Distribution of the White River Colorado Gila, Pahranagat Spinedace, and Moapa Dace

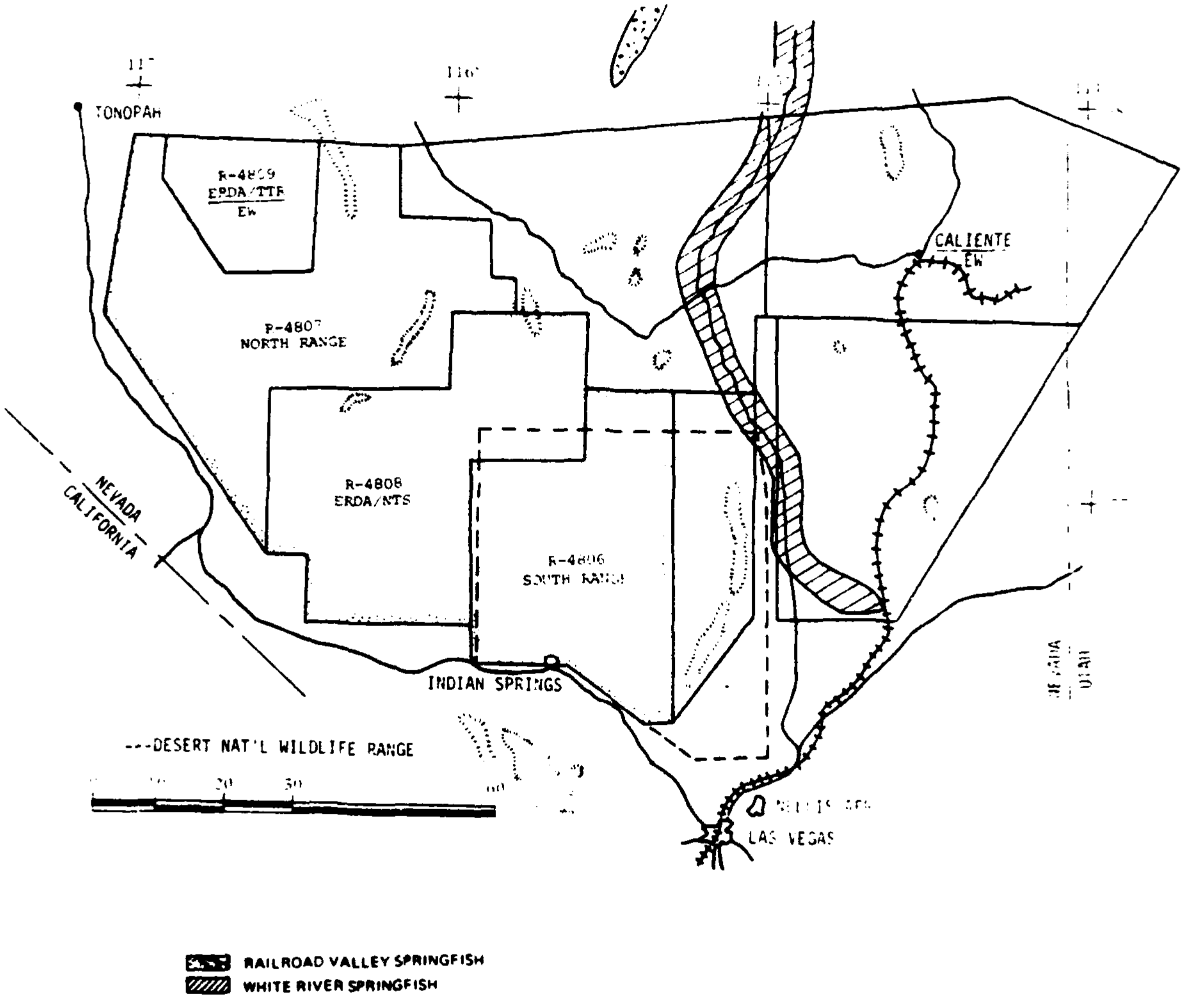


Figure D-14 - Distribution of the Railroad Valley Springfish and White River Springfish

HOOVED MAMMALS (Figure D-15)

1. Dama hemionus hemionus (Mule Deer) - game species.

2. Antilocapra americana americana (American Pronghorn) - game species with a restricted range and appreciable public interest.

3. Ovis canadensis nelsoni (Desert Bighorn Sheep) - game species with a restricted range.

4. Cervus canadensis (Wapiti or Elk) - introduced species with a restricted range.

5. Cows - economic importance.

6. Horses and Burros - high-level of public interest.

7. Domestic Sheep - a few lambs graze parts of NRC seasonally.

PLANTS

1. Artemisia pygmaea (Pygmy Sagebrush) - population status is undetermined.

2. Pinus longaeva (Bristlecone Pine) - species with a restricted range and a high level of public scientific interest

The percentage of total geographic range that lies within the TRC area for the 35 checklisted species is provided in Table D-8. It is particularly important to identify those species with part of their range in target areas of live ordnance use. Areas of live ordnance use within the TRC are located within Restricted Areas R-4806 (South Range) and R-4807 (North Range).

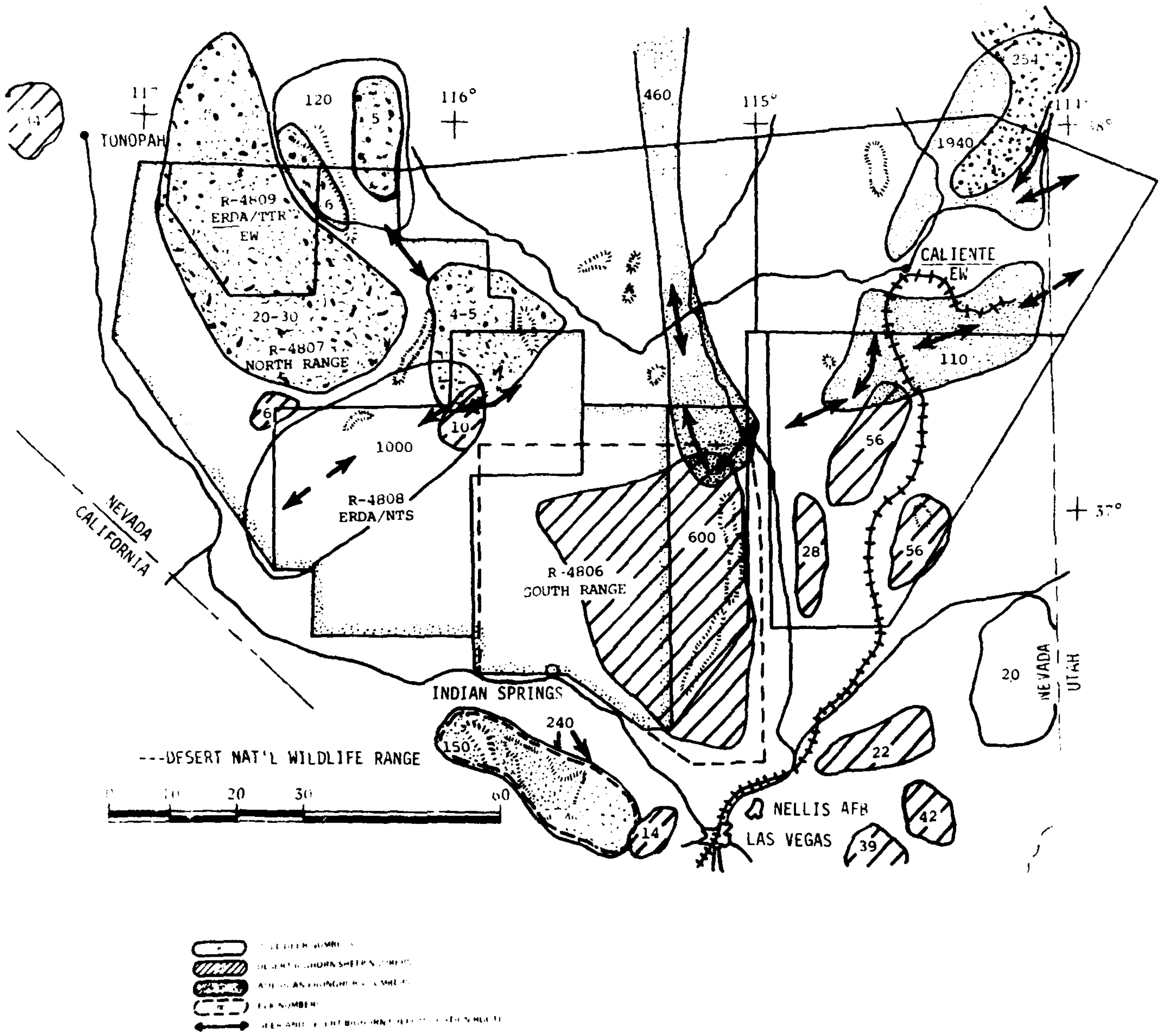


Figure D-15 - Distribution of Large Mammals

TABLE D-8

RANGE AND STATUS OF IMPORTANT SPECIES

Species	Percentage of Total Range Within TRC	Status
Say Chipmunk	100	B, R
Botta Pocket Gopher (T. u. nanus)	100	B, R
Botta Pocket Gopher (T. u. phelleocus)	100	B, R
Dark Kangaroo Mouse (M. m. albiventer)	100	B, R
Dark Kangaroo Mouse (M. m. sabulonis)	75	B, R
Pallid Kangaroo Mouse (M. p. ruficollaris)	95	B, R
Pallid Kangaroo Mouse (M. p. purus)	100	B, R
Montane Meadow Mouse	100	B, R
Wood Ibis	Unknown	M
White-faced Ibis	Trace	B, M
Furriginous Hawk	Trace	Unknown
Golden Eagle	Trace	B, R, M
Bald Eagle	Unknown	M
Osprey	Trace	M
Prairie Falcon	Trace	B, R, M
Peregrine Falcon	Trace	R, M
Snowy Plover	Trace	R, M
Long-billed Curlew	Trace	M
Burrowing Owl	Trace	B, R
White River Gila	100	B, R
Moapa Dace	100	B, R
White River Spinedace	50	B, R
Pahranagat Spinedace	100	B, R
White River Springfish	90	B, R
Railroad Valley Springfish	50	B, R
Mule Deer	Trace	B, R, M
American Pronghorn	Trace	B, R
Desert Bighorn Sheep	10-15	B, R
Domestic Cow	Trace	--
Wild Horses	Unknown	B, R
Wild Burrow	Unknown	B, R
Domestic Sheep	Trace	--
Pygmy Sagebrush	5-10	R
Bristlecone Pine	5-10	R

R = those species that remain within the TRC all year around; B = those species that breed within the TRC; M = those species or populations that pass through or remain in the TRC part of the year, generally spring, fall or winter.

As seen in Table D-8, some species only have a trace of their total geographic range within the TRC. This, however, does not indicate that this species should be removed from consideration. An example is the peregrine falcon whose numbers have been reduced by 90 percent within the United States and is virtually extinct in the Eastern United States, now existing only in local pockets in the Western United States. Not withstanding the fact that they occur only sporadically in the TRC, each individual of the now-remaining population is of critical importance. Especially important are areas of potential breeding locations such as the Pahranagat Valley. These areas should be given special consideration.

At least three species of fish (Moapa Dace, Pahranagat Spinedace, White River Colorado Gila) have their entire range within the TRC and occur along only a few miles of streams in isolated ponds. Such small populations are particularly sensitive to disturbance or interference. In part, they have been reduced to such low levels because of interference by man by altering their habitats or introducing competitors.

Birds of prey are given special treatment here for at least three reasons: (1) the fact that some tend to be sensitive to disturbance, (2) they are top carnivores and are thus extremely important to eco-systems, and (3) they have seriously declined in many regional areas throughout the United States because of the impact of a combination of environmental perturbations.

In general terms, the Pahranagat Valley is considered to be one of the key wintering areas of buteo hawks in southern Nevada (Robert Oakleaf, Nevada Fish and Game, pers. comm.). However, there are no values available as to the numbers of individuals this involves. Along with the wintering buteos, small numbers of bald eagles also winter in Pahranagat, the White River valleys and the Overton area. Actual numerical values are not available currently on bald eagle. In general, raptors may be considered to winter in areas where high concentrations of prey populations exist. Also of considerable importance are localized water sources. Because of the widespread nature of rabbits, a prime food item for large hawks and eagles, raptors might be expected to be thinly spread over broad areas of the TRC during the winter.

Breeding populations are also poorly known. One might suspect, however, that the breeding densities would be more or less restricted to cliff lines along mountain escarpments or areas of trees. Generally, golden eagles and prairie falcons appear to be most highly concentrated in northern Nevada and diminish southward. About 88 nests of breeding golden eagles were located in Elko County in 1972 (Page and Seibert, 1973) and it must be considered that the density is markedly less for Lincoln, Nye, and Clark counties.

Those areas of cliff front that overlook water sources are considered important if for no other reason that the potential they provide should peregrine falcons regain their former numbers. The areas within the TRC that meet these criteria are Pahranagat Valley and the Caliente-Panaca area.

It is important to remember that those species determined by the Secretary of Interior to be threatened with extinction, and as periodically amended in the Federal Register, are given full benefits by Federal law as provided for in the Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa) and 1966 (80 Stat. 926). Additionally, Federal protection is afforded those birds migrating through the TRC as amended by 16 U.S.C. 703-711. Eagles, of both species, are protected through the Bald Eagle Act, as amended by 16 U.S.C. 668-668d. Wild horses and burros are afforded full federal protection against any form of exploitation or harassment as provided by Public Law 92-195.

*Game Animals:

Numbers of mule deer (based on hunter records (Popey, 1972)) vary a great deal throughout the TRC area both annually and geographically (Figure D-15). Although most of the animals estimated for the TRC Range are found in the northern and northeastern regions, relatively large numbers are found on the Nevada Test Site, possibly because they are protected from hunter pressure. Deer herds are found almost entirely in the Pinon-Juniper woodland or the forests and mountain shrubs associated with them. This habitat provides both the required cover and food, since deer are browsers rather than grazers. In this

*Population numbers based on latest available information.

regard, deer can be expected wherever Pinon-Juniper woodland occurs, although their population sizes vary appreciably.

Desert Bighorn Sheep are relatively common in extreme southern Nevada, often south of the TRC, although about 732 of an estimated 1,025 are within the TRC itself (Figure D-15). It should be noted that Bighorn Sheep will probably be found at lower elevations only when in transit from one grazing area to another. Their normal habitat is in the mountainous terrain. Seasonally they move to the alluvial plains to graze.

Although there is a sizeable American pronghorn population in northern Nevada, only limited numbers are found in the southern portion of the state. A summary of pronghorn in and near the TRC reveals that there are approximately 380 animals, most of which are found in the northern portion of the range.

Elk are found in the Charleston Peak area southwest of the TRC where 150 animals are reported. They have been introduced into the area and are intensively managed.

Rabbits form an important source of recreation, and judging from the number of hunters involved, are important to the monetary gain produced in the state by hunting.

A considerable and significant recreational and monetary resource exists in hunting game birds. These are broken into upland game, such as quail and doves, and waterfowl. There are no reliable estimates of the total number of animals involved in the region affected by TRC operations.

Although no values are available for numbers of hunters within the TRC, a safe estimate might be as many as 1,600 hunters taking 16,000 game birds. This must be considered speculative, but if this value is a reasonable estimate, then this represents a considerable recreation and economic resource.

Major areas of waterfowl hunting within the TRC or the immediate surrounding area are the Kirch and Key Pittman Wildlife Management Areas and Pahranagat National Wildlife Range.

*Migrating Species:

An important feature of many species is their migratory habit. The biology of migration is a complex behavior with a long evolutionary history, resulting in the present behavior essential for species survival. Animals winter in certain areas because they afford protection, food supplies, etc. The areas that are used by migrating species are optimum in the limiting factors, while the areas not frequently used usually lack some of the critically important factors. That is to say, although unused areas "look good" to the human eye, they probably are not, or they would be occupied by animals. If migratory animals

*Population numbers based on latest available information.

are artifically or unnaturally restricted from migrating, serious biological consequences could result, such as greater predator exposure, greater food stress, etc. It should also be mentioned that some of the migratory routes used by animals are "traditions" that have become part of the animals' biology through hundreds of generations. Many times, these traditional behaviors may not be altered and have the species still retain substantial survival capability.

Species that are potentially in a position to be affected are Desert Bighorn Sheep, Mule Deer, and about 66 percent of the birds that occur within the TRC which migrate and can be placed in the following groupings: 5 species of divers, 8 species of heron-like birds, 18 species of waterfowl, 6 species of raptorial birds, 6 species of marsh birds, 30 species of shore birds, 16 species of sub-song birds, and 80 species of song birds. This picture is not precisely accurate, however, because in a species like the mallard for example, which is considered resident, there are populations from northern climates that move into Nevada in the winter to augment the numbers of birds that remain there year around. Because the species can be found year-round, it may be considered a resident, although the individuals that make up the summer population may be from a totally different population than those that comprise the winter populations.

Staging grounds are important to a bird's preparation for migration. It is here that they acquire sufficient food to accumulate the necessary energy reserves to make a successful migration. Of special concern are well-established areas of waterfowl wintering and migration that are in areas of high use potential within the TRC; namely, the Pahranagat National Wildlife Refuge.

In 1972-1973, between August and May, there were 30,000 migrating ducks, swans, geese, and coots at Pahranagat National Wildlife Range.

During the 1972-1973 migration season, 67,000 individuals visited Kirch Wildlife Management Area while 34,000 were recorded at Key Pittman Wildlife Management Area; thus, there was a total 1972-1973 usage of about 131,000 individual waterfowl birds of 19 species:

Mallard	Canvasback
Gadwall	Scaup
Pintail	Goldeneye
Green-wing Teal	Bufflehead
Cinnamon Teal	Ruddy Duck
Widgeon	Canada Goose
Shoveler	Snow Goose
Wood Duck	Whistling Swan
Redhead	Coot
Ringneck	

Peak months of migration at Pahranagat National Wildlife Refuge were December and January, while at Kirch and Key Pittman Wildlife Management Areas they were October and November (Borngraver, Malini, and Tsukamoto, 1973).

Data are not available on the precise numbers of Mule Deer and Desert Bighorn Sheep migrating in the TRC area but it is probably between 7,000 and 14,000 based on deer harvest data from the Nevada Fish and Game Department. Only the migratory routes could be assessed, and these are not at all clear (Figure D-15). Additional assessments

of the possible impacts of low-level flights on migration will probably be required if, as the TRC develops, the characteristics of future paths differ from those of the present activity in these areas.

SECTION TWO

RELATIONSHIP OF THE ACTION TO LAND USE PLANS, POLICIES AND CONTROLS FOR THE AFFECTED AREA

TRC operations interact with the activities of several other agencies and, in some cases, require procedural decision-making processes on the part of these agencies. The rule-making process of the FAA in regard to the TRC airspace proposal is a good example, as well as land withdrawal from the Bureau of Land Management (BLM) which may be sought. There is also the general category of regional and municipal planning continually in process. In this section, likely areas of TRC interactions are discussed from the perspective of the land use plans, policies and controls of various entities.

A - BLM and the U. S. Forest Service

In undertaking TRC activities, the Air Force must locate various landbased facilities and installations on the lands in the range areas. When these facilities are outside of the land already withdrawn by the Department of Defense, it will be necessary for the Air Force to obtain either a withdrawal of land for the specific

purpose for which it will be utilized, or to obtain an easement which will allow the use required by the Air Force to travel to a given threat simulator site, or a permit which will allow temporary use of the given site.

The simplest form of site use involves a temporary agreement between the authorized officer of another agency and the District Manager of one of the BLM district offices. The agreements are for clearly temporary use, other than for a permanent installation or use. Presumably the use will not involve significant disruption of the environment, otherwise a formal environmental assessment or an environmental impact statement might be required.

The granting of an easement, as for construction of a road or installation of communications equipment, requires more formal procedures in view of the relatively permanent potential effects on other parties. For roads, for example, there must be submitted a map showing location of the right-of-way. If there are mining claims, easements must be obtained. The agency must negotiate location, use, maintenance, environmental concerns, and all other appropriate matters.

The National Environmental Policy Act of 1969 has caused the BLM to be sensitive to any proposed use of public lands that might cause

a significant adverse impact on the environment. The Air Force will assess the impact of any future land uses on the physical resources and individuals and communities in the area. Multiple use of BLM lands involving the Air Force as one of the users is not uncommon. A good example is the existing shared use of the Wild Horse Management Area on the TRC North Range which is formally circumscribed in letters of agreement between the Air Force and the Department of Interior. These agreements carefully delineate mutually agreed to constraints which allow both agencies to fulfill their responsibilities.

A small portion of the Humboldt National Forest in the Quinn Canyon Range underlies the proposed boundaries of Sadek North. Any requirement for a land withdrawal of a small parcel of this forest preserve for TRC use will be handled by the BLM as are mining claims on national forest lands. In that case the procedures and policies pursued by the BLM as described previously would also apply.

Alternatively, the U. S. Forest Service can enter directly into agreements with the Air Force to grant use of small portions of the National Forest in accordance with the Joint Policy Statement between the Department of the Air Force and the Department of Agriculture dated September 12, 1951 (Forest Service Handbook, Title 2700, Page 197, September 1958). Because the Quinn Canyon Range is within an

inventoried roadless area and contains stands of Bristlecone Pines the conditions and constraints for such a use permit would be made compatible with policies for the management of roadless areas and protection of live Bristlecone Pines and prevention of degradation and scavenging of their dead wood. Each use permit would be subject to the requirements for an environmental assessment or statement prior to any construction. Additional areas of concern in this respect may arise when detailed plans are formulated to link the TRC to Nellis with a microwave system. Location of microwave repeaters in U. S. Forest lands will be carefully considered.

B - U. S. Fish and Wildlife Service

The existing TRC presently makes use of the western half of the Desert National Wildlife Range, lying just northwest of Las Vegas. The Desert National Wildlife Range is administered by the Fish and Wildlife Service of the United States Department of Interior and has been proposed for inclusion in the National wilderness system pursuant to the National Wilderness Act of 1964. Air Force operations on the Wildlife Range are conducted under a Memorandum of Understanding between the Departments of the Interior and the Air Force.

The portion of the Desert National Wildlife Range proposed for inclusion as a wilderness area comprises most all of the eastern half

not now lying in the TRC range boundaries (with small adjustments in recognition of local developed areas in peripheral portions of the Range) plus the higher elevations within the test range portion of the range. Resolution of this proposed wilderness designation has been negotiated with Air Force interests.

Although the wilderness designation does not detract from the original purposes as a wildlife range, it does provide for other purposes such as a place of solitude where man is considered a visitor. However, the present Memorandum of Understanding between the Air Force and the Department of Interior should render such activities compatible with a possible wilderness designation, provided that protective language is inserted in the enabling legislation for the wilderness area.

C - Nevada State Recreation

The Department of Conservation and Natural Resources of the State of Nevada in the mid-1960s concluded that the State's urban and non-urban recreational facilities were "pathetically inadequate to meet public needs." The Department recommended an expansion, modification, and intensification of all recreation programs by all relevant federal, state, and local agencies. It further urged stepped-up spending to acquire land and water resources having outstanding recreation potential. The Department predicted that whatever happened with regard to industrial

or agricultural development, in Nevada, "The economy of Nevada is expected to remain centered on the tourist industry." With respect to industrial development, it argued that one of the chief attractions that Nevada offered was "uncrowded living." Industrialists, the Department asserted, like Nevada because there is space to live and play.

The state has projected recreation attendance by 1980 of 2.55 million for the North Central and East region in which most of Lincoln County is located. Sixty percent of all visitor trips come from California, but only 3.6, 2.2, and 1.3 percent of all trips originate in the adjoining states of Utah, Oregon, and Arizona. Thus, the recreation industry is very much tied to the economy of California.

The state has continued its effort toward developing a plan for outdoor recreation. In 1971, the Department published a statewide comprehensive outdoor recreation plan in which it again recommended an agressive program of land acquisition of land protection and preservation of the limited water resources. It especially urged a substantial increase of funding at all levels of government for acquisition, protection, and operating purposes.

Part of the goal in assessing recreation potential in the state is to preserve open space which is defined as "land or water surface open to the sky" and encompasses land used for livestock range, agriculture, parks, recreation, vistas and views, wildlife conservation,

transportation routes, or places of landing. An Ad Hoc Committee on Environmental Quality reported on Nevada's heritage in 1970 to the effect that "many of these lands should be preserved as open spaces, for, in the total environment, the role of open space is to provide a balance between development and non-development. The function of open space is to provide breathing space, recreational outlets, green areas, and retreats of natural beauty and scenic value."

The state has identified numerous potential recreation sites in the various regions of the state. In the northern part of Lincoln County, within the Caliente EW Range area, 24 such locations have been identified, ranging from 7,600 acres of the Fortification Range in the far north of the county to 10 acres at Bristol-Wells. All but one of the sites are under the management of the BLM. Nearly all of these sites would be classified as natural environment areas, or outstanding natural areas, while a few would be classified as historic and cultural sites. The primary objective of natural environment areas is to allow the visitor to enjoy the resource "as is," in its natural setting. Outstanding natural areas are those that are remarkable for their "natural wonder, high scenic splendor, or features of scientific importance."

In addition to identifying such sites, the state has recommended acquisition of nine areas as high priority matters for outdoor recreation. These include portions of Highland Peak, Delamar Mountains, Wilson Creek Range, and Gleason Canyon, all within or near the Caliente portion of the TRC.

With respect to potential noise disturbances, the character of TRC activities over these recreation areas will be important to the planned future development of these areas. Consultation with state and local planners regarding the plans and policies for recreational developments will be essential to avoid incompatibilities between TRC airspace uses and underlying recreational uses.

D - Airspace Use

As a result of the Federal Aviation Act of 1958, the FAA Administrator is manager of all airspace in the U. S. and thereby exercises a measure of control of all uses of U. S. airspace. He does not have the jurisdiction to control or regulate activities which take place on the ground. The administrator may determine that a ground activity will or might present a hazard to aviation. A transmitting antenna tower in excess of 200 feet in height, for example, could present a hazard to aviation. Were it to be built despite the FAA finding of hazard, the Federal Communications Commission would not issue a license. Beyond such indirect regulation of ground activities, the FAA Administrator has no control.

The proposed TRC airspace is related to three broad areas of airspace use plans and policies. These are:

1. Relationship to the NEPA.

2. Relationship to Federal Aviation Regulations (FARs).

3. Relationship to Compatible Use Zones in the Las Vegas area.

The Airspace Proposal is a key element in safe and efficient TRC operations. Accordingly, the U. S. Air Force has decided to include consideration of the airspace as an integral part of the TRC FES to better satisfy NEPA objectives.

Federal Aviation Regulation Part 73 refers to restricted areas. The user of any restricted airspace is required by Part 73 to notify the FAA in the event that the user's operations are modified so that sole use of the restricted area by a single user can no longer be justified. For example, if a hazardous situation which originally justified sole use no longer prevails continuously (or nearly so), then the FAA is required to redesignate the operational status of the restricted area. The new designation may be in terms of time periods based on a use schedule supplied by the user. Alternatively, the FAA may merely redesignate the restricted area to be joint-use, without specifying periods of use.

"Shared use," on the other hand, is a USAF term meaning simultaneous use of the airspace by the designated user and other user(s). The FAA does not differentiate between joint-use and shared use.

In the case of the proposed TRC airspace, two restricted areas (R-4807, R-4809) are to be redesignated as joint-use. The intent of the proposal is to make these areas available for public use during periods when they are not required by the USAF. In particular, it is proposed that R-4807 be divided into three independently releasable portions, R-4807A, B, and C. In these areas the public will be permitted to use this airspace when it is released. Naturally, when the USAF again requires use of the airspace, the public will not be permitted access during the time of USAF use. The case involving R-4809 is slightly different. The ERDA is the designated user of R-4809. In 1969, the ERDA and the USAF entered into an agreement which, in effect, made R-4809 shared use airspace (in USAF definition). The airspace proposal seeks to formalize this interagency agreement by proposing that the FAA properly designate R-4809 to be joint-use. The intent of this proposal is to permit public access to R-4809 when neither the ERDA nor the USAF is using the airspace.

E - Compatible Use Zones

Three airports operate in close proximity to each other in the Las Vegas area; Nellis AFB, North Las Vegas Airport, and McCarran International. These airports form a triangle whose sides measure only 8, 8, and 10 nautical miles respectively. They cater to the military (Nellis), general aviation (North Las Vegas), and air carriers (McCarran). Their proximity to each other, the relationships of their runways, the diverse types of aircraft using them, and the volume of air traffic that each generates combine to produce the terminal ATC environment. To cope with this issue, letters of agreement between the control towers at each airport establish compatible use zones and ATC procedures which enable safe and efficient air traffic flows. Letters of agreement exist between Nellis tower and McCarran tower, and between North Las Vegas tower and McCarran tower.

SECTION THREE

PROBABLE IMPACTS OF THE ACTION ON THE ENVIRONMENT

A - TRC Airspace Proposal

This section outlines the probable impacts that might result from implementation of the Airspace Proposal. In general, these impacts may be classified either as impacts on aviation or impacts on ground based operations.

Military operations will be performed with added safety. In civil aviation, general aviation operations will be the primary beneficiaries of the enhanced safety, since communications with ATC would be required to transit Sadek East and Sadek North.

A preponderance of air carrier operations occur above 18,000 feet MSL and therefore are already operating in controlled airspace. Air carriers will thus only in general derive enhanced safety because of the Airspace Proposal. Air Taxi operations below 18.000 feet MSL can also expect improved safety.

Notwithstanding the provision of VFR flyways, the Airspace Proposal may provide an obstacle to some aviation operations. The following is a brief list of potential reasons:

1. The pilot may not wish to fly as low as the VFR flyways require thus requiring him to ground or air file a flight plan to traverse the TRC.

2. The pilot may not have referred to current aeronautical charts and airman's information publications.

Even in the case where the pilot understands the procedure for transiting the TRC, he may choose among several alternative flight plans. For example, a typical trip which ordinarily might use Victor Airway 244 involves flight between Grand Junction, Colorado, and the San Francisco Bay area in California. On airways this trip is approximately 710 statute miles. With the TRC airspace structure, a pilot may wish to circumnavigate the TRC at a slight increase in trip distance. This could increase the trip distance to 850 statute miles.

In mountainous terrain, pilots usually elect to fly higher above ground level than they would over lowlands. Two important reasons for this are:

1. Surveillance, communications, and navigation coverage may be less than satisfactory at lower altitudes.

2. Additional altitude provides vital extra time and gliding distance for selecting a place to land in emergency.

An East-West Flyway proposed along V-244 between Tonopah and Wilson Creek would restrict users of the flyway to remain at or below

12,500 feet MSL. The following observations pertain to the implementation of the proposed flyway:

1. It would require operations to be conducted with 2,270 feet of altitude clearance of the main peak in the Quinn Canyon Range (approximately mid-way between Tonopah and Wilson Creek).

2. It would result in two directions of VFR traffic into this clearance layer.

3. It would limit operations to a maximum of 12,500 feet MSL over mountainous terrain where the average terrain is approximately 6,500 feet MSL and where the route crosses eight peaks or ridges in excess of 7,500 feet MSL.

These situations would probably occur regardless of two other offsetting factors:

1. The rule requiring oxygen above 12,000 feet M during daylight hours* (10,000 feet MSL at night).

2. A likelihood of a deviation through Sadek North, even during daylight hours when it is expected that the USAF will be using the airspace.

However, the flyway airspaces will be free of TRC conflict thus providing a measure of safety in their use not now available to VFR operations in the same airspace.

*This rule permits operation in excess of 12,000 feet MSL during daylight for periods not exceeding 30 minutes.

Search and Rescue (SAR) operations in the vicinity of the TRC will see a beneficial impact when low-level TRC communications and surveillance capabilities are implemented. SAR activities will not be hampered by the implementation of the Airspace Proposal since priority will be given to the SAR missions.

Both the U. S. Forest Service and the BLM rely on aircraft operations in the discharge of their responsibilities, most notably, fire reconnaissance and control operations and livestock management. Equipment used in these operations include both fixed wing aircraft and helicopters. By their nature fire occurrences are a random process within a generally defined fire season and, therefore, do not allow fire-fighting operations to be scheduled. Furthermore, to be effective such operations are time urgent and must have high priority.

Areas identified as high hazard areas near or within Sadek North are:

Quinn Canyon Range

Blue Eagle Mountain

Wayne Kirch Wildlife Management Area

South Egan Range

South Schell Creek Range

In Sadek East, high fire hazard areas are:

Wilson Creek Range

Bristol Range

Highland Range

Cedar Range

Clover Mountains

Delamar Mountains

The incidences of fire occurrence in these regions average about 30 per year in the Ely District, and 20 per year in the Las Vegas District. BLM District boundaries do not coincide with boundaries of Sadek East and Sadek North, however, the data show that fire control operations can occur over a wide portion of these areas and may be staged from airstrips north and south of these areas. Approximately 180 hours per year of flight time is expended by the BLM in fire control and reconnaissance operations.

The Air Force will accord high priority to requirements for emergency use of TRC airspace. For fire control operations, the Air Force will do its utmost to accommodate U. S. Forest Service and BLM emergency aircraft operations. Thus these operations need not incur critical delays in bringing fires under control because of U. S. Air Force control of the airspace. The ability of the TRC Range Control Center to monitor and talk to all aircraft operators in Sadek North and Sadek East can render fire control operations a vital service

when such operations are cleared by rerouting other aircraft out of the area, thereby enhancing the safety of fire control air operations.

The BLM also performs air operations as part of their duties to manage wild horses and livestock. These flight activities occur throughout the year averaging about 385 hours per year, each flight being about two hours in duration. Lands under both Sadek North and Sadek East benefit from BLM management functions for wild horses and livestock. The air operations in support of these management functions are not as time urgent as fire control operations and, through negotiated agreements, the USAF should be able to accommodate and assist the BLM air operations.

The Nevada State Department of Fish and Game conducts a great number of air operations for the purpose of surveying wildlife including waterfowl, antelope, mule deer, elk, bighorn sheep, mountain lion, sage grouse, chukar, and furbearers. The state is divided into three regions for this purpose with Region III being most directly of concern to TRC operations. The aerial surveys are conducted at low altitude, about 200 feet above ground level, and are of variable duration. Scheduling depends on the wildlife to be surveyed, but due to the variability in types of wildlife, activities occur throughout the year in each of the three regions.

Region III comprises the counties of Clark, Esmeralda, Lincoln, and Nye which, except for Esmeralda, are the principle counties underlying the Sadek North and Sadek East. In the vicinity of the TRC, the most important areas requiring aerial surveys for waterfowl are:

Kirch Wildlife Management Area

Railroad Valley Wildlife Management Area

Key Pittman Wildlife Management Area

Pahranagat National Wildlife Refuge

In addition, Region III receives aerial surveys for antelope and bighorn sheep.

The aerial surveys are regarded as highly important to the State Department of Fish and Game's operations. Impacts of the Airspace Proposal would be similar to those expressed previously for similar operations of the BLM for managing wild horses and livestock. It is highly likely that the Fish and Game Department's operations can be enhanced by improvements in TRC air traffic control.

Fixed-Base Operators (FBOs) at airports in the TRC vicinity that may be affected by the Airspace Proposal are those located at Lincoln County, Tonopah, Ely, Cedar City and St. George (Section 1, Figure D-2).

Average daily aircraft flights to-and-from these airports are as follows:

	Flights/Day
Lincoln County	20
Tonopah	20
Ely	18
Cedar City	75
St. George	30

The Lincoln County FBO will probably receive the greatest impact from the Airspace Proposal, due to his location within Sadek East. About 10 of the 20 daily flights are flown in aircraft based at Lincoln County. The FBO expects to lose some of the flight operations at Lincoln County due to what he terms "reluctance of general aviation pilots to fly in areas that high-speed military aircraft are utilizing." The Air Force currently operates in the area but the general aviation community, especially that portion not based at Lincoln, is not very aware of these military operations. Since Sadek North and Sadek East will be depicted on general aviation maps, the flying public will become aware of the military operations. The effect of this awareness on the Lincoln County FBO cannot be accurately determined.

The other FBOs may feel some effect, either good or bad, from the Airspace Proposal due to aircraft that might deviate around the Sadek North and Sadek East areas. Again, this effect cannot be determined.

B - Electromagnetic Radiation

TRC operation entails the use of a number of electromagnetic radiators spread throughout the range. These radiators consist of ground-based mobile and fixed equipment, as well as airborne equipment. The spectrum of operating frequencies will range roughly from 10^6 Hz to 10^{10} Hz. Because a wide range of radiated power levels will be used over this broad spectrum, it is natural to ask what the impact of the electromagnetic radiations could be on the surrounding environment.

There are several possible levels of severity of potential effect to be examined:

1. Possible human injury due to direct or indirect effects.
2. Injury to domestic and wildlife, including flora and fauna.
3. Destruction of property.
4. Disruption of public safety services, including police, fire, and navigation data links.
5. Disruption of entertainment reception.

Human injury and the direct loss of human life is possible under certain circumstances of irradiation, if appropriate precautions were not taken. Such effects are not anticipated on the TRC. The conditions under which the possibility exists are similar to the conditions under which damage to other animal life is possible in a vast number of long-standing applications throughout the country. The possibility of

destruction of property due to electromagnetic radiation covers a wide field, and although many specific questions remain unanswered, the effects are expected to be very similar to those long accommodated in the TRC area. The possibilities of disruption of public safety services, civil and commercial communications, and entertainment reception all pose similar problems involving interference at the receiver site. These effects will need to continue to be avoided through study, allocation and authorization as well as through procedures and policy.

Numerous studies have been undertaken to establish living tissue tolerance levels to electromagnetic radiation. S. Michaelson's survey paper on this subject lists a bibliography of 292 references, of which about 140 are directly concerned with radio frequencies up to the long-wavelength infrared regime.

Electromagnetic radiation is propagated energy, which, if intercepted and absorbed, ultimately results in the generation of heat and elevated temperatures in the absorber. The production of heat in living tissue due to microwave absorption is well-established and documented. This mechanism appears to be the dominant effect in the interaction of microwaves with living tissue and is termed the thermal threat.

With respect to thermal effects, the bloodstream is important in distributing and dissipating body heat and it can be expected that the regions of the body with a poorly developed vascular system would be

especially sensitive to irradiation. The lenses of the eyes are in fact particularly sensitive to thermal damage. Exposure levels of 100 mW/ cm^2 for one hour to 2450-MHz radiation does indeed cause thermal coagulation of lens protein[16,17] and cataract formation in rabbits. There is also some argument for cumulative effects at somewhat lesser dosages repeatedly applied at short intervals. (Experiments at 50 mW/cm^2, 2450-MHz, one hour repeatedly applied (daily) apparently do not cause discernible eye damage.)

It must also be stated that the threshold of warmth sensation (on the forehead) occurs at about 30-50 mW/cm^2 (long time), [19,20] while the threshold for pain (long time) is roughly twice this intensity. Higher intensities produce a pain sensation in correspondingly shorter times (20 seconds for 3.1 W/cm^2 at 3,000 MHz).

These types of considerations have formed the basis for setting tolerance limits and standards in the U. S. The first protection guide used in this country was in 1953, and was set at 10 mW/cm^2, with no time limit set. Subsequent guides have relaxed this guide, allowing higher irradiation levels for short periods (0.1 hour to 10 minutes). In the interest of simplicity, the 10 mW/cm^2 (average power) rule will be adopted in the work herein with no time limit, and regardless of spectral content or modulation.

This criterion for the safe level of exposure is the same as that adopted for TRC operations. TRC procedures also call for posting as hazardous any areas found to experience radiation levels above 10 mW/cm^2.

It should be noted that with this tolerance limit there should be roughly a safety factor of 10 for both men and rabbits, and probably for most other animals.

The tolerance limit for flora is more difficult to set, primarily because so little is known either about the absorptivity for plants or their tolerance to heat. It is assumed that the tolerance would be related to a maximum whole volume temperature, and hence is a function of the temperature rise above ambient. The tolerance limit on a hot day may therefore be very much less than on a cold day. Furthermore, tolerance limits would undoubtedly vary widely from species to species for the following reasons:

1. Differences in water content, and concentration.

2. Differences in high temperature tolerance.

3. Difference in the location, depth, and volume of the living portion of the plant.

4. Differences in periods of dormancy, reproductive cycle, normal plant lifetime, etc.

5. Other factors such as cooperative shielding among plant neighbors, etc.

In spite of these remarks, and the extreme paucity of data, it would seem that the 10 mW/cm^2 criterion accepted for animal life would not be an unreasonable one for plants as well, especially since these same plants must be capable of withstanding the sun's maximum irradiance level of about 100 mW/cm^2, in a spectral region that is more highly absorbed generally than the microwaves.

The far field average power density level radiated from a transmitter can be approximated by:

$$F_{av} = \frac{P_{av} G}{4\pi R^2}$$

where F_{av} = the average flux level

R = the range

P_{av} = the average power level

G = the average gain

The near-field average <u>radiated</u> power density can be approximated by

$$F_{av} = \frac{P_{av}}{A}$$

where A is the effective antenna aperture of the radiator.

These two equations combine to give an expression for the average flux intensity in the main beam, or the peak flux intensity when P_p (the peak power) is substituted for P_{av}. In either case, the juncture

between near and far fields is essentially defined where the two expressions yield the same flux intensity.

Of all the electromagnetic radiators which will be used on the TRC, those with the highest average power-gain product by orders of magnitude are of the ground transportable type. A representative of these high power-gain devices has a $P_{av}G$ of just over 10^7 watts. This device can just produce 10 mW/cm^2 ($100/W/m^2$) in the main beam at a range of 100 meters. It can exceed this radiated value by a factor of more than five at shorter ranges. Other radiators produce comparable or less radiated flux.

Since all the antennas are elevated above ground level, it is highly unlikely that the main beam of any of the threat simulators will be directed, under normal operations, at or near points at ground level within one hundred meters distance. However, one simulator to be used, which allows an antenna tilt downwards of 10 degrees below horizontal, has been measured to produce a personnel hazard ($10mW/cm^2$) 53 feet from the antenna. Thus continued emphasis will be necessary with regard to this hazard and suitable protective procedures will need to be observed.

The conclusion which can be drawn from these calculations is simple: that with proper care in placement, i.e. greater than 100 meters from all non-participating parties, and due indoctrination of operating

personnel concerning the health hazards inherent to the operation of these equipments, no hazard to either people or domestic animals will result.

Wildlife within a radius of 100 meters from the equipment may be injured, but this potential is likely to be limited to flying birds which may get into the main beam of the apparatus and then only for very short time periods, an unlikely event.

Where equipment deployment is in close proximity to roads and highways where there may be some concern for hazard to passers-by, operations procedures will be carefully screened to assure safety. In general, all these concerns are addressed in the Range Safety manual. Furthermore, techniques are available, such as the fitting of mechanical stops, to prevent antennas from being directed at nearby ground level locations. Also, simple wire mesh fences of sufficient height can be erected to intercept and scatter any radiation from the antenna that otherwise would be directed at ground levels.

Certain prosthetic devices, notably those intended to electrically stimulate internal organs, the central nervous system, and certain other sensory systems are coming into general usage. Some of these devices are, by their very nature, highly susceptible to radiated electromagnetic fields. Most notable among these devices are the cardiac pacemakers, both because they are more common than the others and because any interference with these devices is potentially dangerous to the wearer.

Typically, these devices, together with their associated electrodes, constitute miniature antennas roughly tuned to microwave frequencies. In addition, the internal circuitry of first-generation devices is relatively unshielded. The currents generated in these devices from immersion in a radio frequency field may directly stimulate the organs to which they are attached but, more likely, these currents will obstruct the operation of the prosthetic device itself. The demand-type pacemaker in particular is known to be susceptible to this type of interference, changing its pace rate, reverting to a fixed operation or becoming entirely inactive.

The Air Force has conducted extensive studies on the susceptibility of implanted cardiac pacemakers to electromagnetic radiation emitted by radar systems. A number of investigators have determined that pacemakers in general are susceptible to electromagnetic fields generated by small motors, electric drills, electric razors, auto ignition systems, diathermy machines, etc.[22,23] Their susceptibility to 2540 MHz radiation has been of great concern because this is the operating frequency of microwave ovens.[24] One documented case of actual interferences from a microwave oven appears in JAMA[25]. In an unusually well-documented case of the effects of a radar on a pacemaker-controlled hospital patient,[26] premature paced beats or pauses occurring once every 12 seconds were shown to correlate with the revolutions of a large antenna for a radar station one mile from the hospital. This pacemaker was a Medtronic Model 5340, an external unit intended to be placed on the bed.

The recent paper by Mitchell et al[27] evaluated the relative susceptibility of cardiac pacemakers to electromagnetic radiation interference at representative radar sites in the United States. The 21 pacemakers of different types and manufacturers were evaluated in a "free field" configuration, as well as in a saline solution phantom (implantation simulation). Test results were presented for five frequency bands between 200 and 6,000 MHz. These data and other referenced material indicate the most critical frequency range for causing pacemaker interference is between 200-500 MHz. Pacemaker patients with the most sensitive pacemakers can experience electromagnetic radiation interference when located within 1,000 to 2,000 feet of a high powered 200-500 MHz pulsed radar (field strength of 10V/m). There are no TRC ground radar systems operating in this critical frequency range. The highest power TRC radiator operates at a frequency an order of magnitude greater than the critical frequency range, which increases the field strength susceptibility threshold for the most sensitive pacemaker to 1,500 V/m. Participating and non-participating personnel are restricted from areas in which field strengths of this magnitude could be experienced. Other TRC radiators, like the threat radar simulators, are not expected to cause any significant pacemaker interference within 1,000 feet of the antenna. Range safety procedures will limit the use of the mobile threat simulators so they cannot irradiate any unrestricted area within 1,000 feet of the antenna.

Electromagnetic radiation can cause direct damage to certain types of sensitive equipment and materials. These effects are almost exclusively limited to direct electrical degradation and failure of the target material. Thermal heating also occurs, but for even very high radiation intensities, the damage potential due to heat can be almost totally ignored. Electromagnetic energy has been known to cause deleterious effects on certain electrical equipment. Sensitive radar receiver crystals are normally packed in foil to protect them from damage, for example. Almost any open (unshielded) circuitry containing rectification devices will develop spurious voltages, sometimes large enough to puncture semiconductor devices and destroy the circuitry. Fluorescent lights are known to light in moderate to strong microwave fields. Even some hearing aids can be expected to reproduce the modulation of a nearby transmitter. Tin cans, automobile frames, etc., have been known to sing in the presence of strong electromagnetic signals. While most of these phenomena are not in themselves damaging, they can be highly disconcerting, possibly eliciting fear.

These phenomena all have a common denominator: they are all strong-field effects. Fields sufficiently strong to produce these effects could occur within main beam illuminations of the more powerful TRC emitters at distances of one to two miles. As already noted, however, normal location of TRC emitters and operation of TRC threat simulators are constrained by safety procedures which will not allow the main beams of the emitters to be directed at or near ground levels

within such short ranges of areas of potential risk. The TRC threat simulators used in the Caliente and Tonopah EW Ranges are manually operated and mounted aboard mobile vans. Several of the simulator sites are located within two miles of inhabited areas and there is the possibility that error in operation of a simulator in violations of prescribed safety standards could result in main beam illuminations of ground areas although these circumstances are unlikely and will be carefully guarded against.

The electromagnetic radiators used on the TRC can be classed under two broad headings; ground-based and airborne equipment. The ground-based equipment in general radiates much stronger signals than the airborne equipment by several orders of magnitude. There are other distinctions. The ground-based equipment is, in general, only capable of radiating over a few, relatively fixed frequency bands. The airborne equipment, by contrast, has the capability to radiate over a very broad frequency band.

Diffraction effects will allow propagation beyond the line-of-sight, but the attenuation in the "shadow" region is so great at these frequencies that these effects could also be neglected. Reflections from mountains and other high objects could produce effects much like the ghosts which sometimes are evidenced in commercial TV. By and large, however, the frequencies we are considering here are line-of-sight frequencies. Hence, the TRC ground-based equipment will not affect

other ground-based equipment more than a few miles beyond the horizon, a range of less than 50 miles. The ground-based equipment could, however, interfere with high-flying aircraft carrying sensitive equipment at a range of perhaps 400 miles. Airborne equipment could likewise perhaps interfere with non-participating receivers at a range of perhaps 400 miles, depending upon the aircraft altitude. These potential influences must continue to be avoided or minimized through a comprehensive frequency management program.

Sensitive equipment can be defined as any receiver tuned to the radiating frequency or a receiver which does not have sufficient reception capability to eliminate strong signals outside the intended pass band. Two types of reception failure typically occur. First, the receiver does not filter out strong signals close to its intended pass band due to insufficiently sharp tuned circuit filtering. The second type occurs in superheterodyne-type sets. In this instance, the "image" pass band is not sufficiently rejected by the first (radio frequency) stages prior to the mixer. If either of these conditions exist, strong out-of-band signals will be received as interference. Receiver antenna construction is important to the capability of a receiver to reject unwanted signals. Most higher frequency antennas are constructed with a moderately high gain, such as the typical fringe area TV antenna. Antennas with a good gain characteristic reject signals which arrive out of the antenna main beam pattern. Mobile receivers seldom are equipped with high-gain antennas. Hence, mobile equipment and the base

stations to which they communicate would in general be more likely susceptible to TRC radiations for antenna reasons alone. There may be a few highly directional antennas with either a main beam or a large sidelobe pointed in the direction of one or more of the TRC transmitters. These would tend to be very susceptible to TRC radiations, if tuned to the emission frequency.

It has already been stated that the ground-based equipment will not interfere with other ground-based equipment beyond a range of perhaps 50 miles. Within this range though, there is interference potential to such non-cooperating ground receivers as local television, AM/FM broadcast, mobile services (industrial, public safety) and radio locating equipments unless proper safeguards are taken. However policies and procedures have been developed by the frequency management authority to carefully evaluate the emission spectrum of TRC equipments/tests so that undesirable interference is not experienced by the above non-cooperating ground equipments.

It generally appears that the ground-based TRC transmitters are not likely to cause complete disruption of any FCC-allocated service. Furthermore, there is a considerable history of such operations conducted by the Air Force, and consequently procedures and safeguards have been developed to assure that such operations will be conducted with minimal interference to participating and non-participating equipments.

Airborne equipment, when no care is taken in its use, has the potential to interfere with nearly all types of service over a large area. This general class of equipment is not new to TRC, having been used on many other military ranges throughout the U. S. Consequently, there is a history of experience in operating such equipment with the necessary safeguards to keep any possible interferences to tolerable levels. This prior experience has shown that the most essential feature in developing these safeguards is the establishment of a frequency management authority which carefully and in a detailed manner screens each test. Potential interferences are identified and modifications or alternatives to the test procedures are instituted where warranted.

C - Sonic Booms and Aircraft Noise

Sonic Booms:

There is considerable difficulty in assessing the TRC induced impacts on the environment due to supersonic flight activity. There exists a considerable history of supersonic flights in the TRC region which is summarized in USAF supersonic logs. The supersonic logs show an order of magnitude greater activity throughout this region if SR-71 flights are included. However, this aircraft operates at extremely high altitudes from which booms would be significantly attenuated and much less sharp in terms of rise times, due to non-uniformities in the atmosphere and other factors.

Supersonic activity is primarily associated with the Nellis ATCAAAs. This type of activity is to continue with a modest expansion. ACM missions are expected to generate some sonic boom overpressures up to 5 lb/ft^2 which may extend in width on the ground to 22 to 17 miles at boom cutoff (see Appendix F). Overpressure on the ground at the cutoff point may be between 0.6 and 1.2 lb/ft^2 depending on source Mach number and type of aircraft.

Existing Nellis AFB operational restrictions require that supersonic activity avoid populated or otherwise sensitive areas. During a

mock-duel the aircraft usually are supersonic for a short period of time. The area in which aircraft go supersonic is generally the center of the individual training areas, however, sonic booms occur over the entire area. With the boom width on the ground added to this dimension, the area of impact from any given engagements is a circle of approximately 30 to 35 miles in diameter. Even in as sparsely populated area as the state of Nevada, it is unlikely that the booms will go undetected.

Booms resulting from air combat maneuvering exercises will be incident on lands lying outside the TRC airspace. Much of this land is used for cattle grazing and other large range operations. However, some of the land is the mountainous terrain of the Quinn Canyon Range which is part of the Humboldt National Forest. This area is within an inventoried roadless area, a de facto wilderness designation that may allow the area to eventually qualify for statutory protection under the Wilderness Act of 1964. It has not been established that supersonic activities in the space overlying wilderness lands are necessarily incompatible with wilderness uses, although frequent incidences of sonic booms would most likely detract from the wilderness experience.

The use of TRC airspace for air combat maneuvering exercises will increase the incidences of sonic booms in that region; however, most of the land area of incidence is in the Desert National Wildlife Range with little or no human activity except for visitors to the range. Thus, exposure of humans to sonic booms will be limited to visitors

of the range and military personnel operating in the TRC South Range. Since most of the sonic booms will be associated with air combat maneuvering exercises, which in most instances produce a boom area of incidence on the ground of about one square mile (rather than the moving boom "carpet" associated with level supersonic flight), the likelihood of human exposure to these booms will be relatively small.

There is a previous history of sonic booms occurring in TRC airspace which is expected to continue. There are small isolated communities and ranches in these regions where there is potential for human exposure. Directly under the ACM activity, sonic boom strengths may reach 5 lb/ft^2 at which the probability of producing window glass breakage[28] is around 10^{-5} per pane. In general, the range 2.0 to 5.0 lb/ft^2 is regarded as the region of incident damage to structures.[28] However, ACM exercises could, because of the maneuvers, produce "super-booms"[29] which may have peak overpressures of at least two and up to four times as high. The probability of window breakage at 10 and 20 lb/ft^2 could be 10^{-3} per pane and 0.02 per pane respectively, for these increases in overpressure. It should be noted that "super-booms" do not produce a moving carpet as is normally associated with aircraft in level supersonic flight. Instead, the ground area where the super boom is incident is fixed and of the order of one square mile.[29]

Physiological and behavioral responses of humans have been extensively studied. One review[30] of these studies developed some general

categories for human responses as a function of boom overpressure. Direct physiological effects have been reported at 95 lb/ft^2; however, booms in the range 20-144 lb/ft^2 have been experienced without injury. Temporary effects such as temporary hearing loss may occur in this range, however. Level of overpressure in this range would only be generated for aircraft in low-level (near 200 feet above ground level) supersonic flight. Low-level supersonic flights would be planned to occur over the TRC restricted areas and under procedures that would assure safety of TRC range personnel and equipment.

At boom overpressures in the range 1.5 to 2.0 lb/ft^2 significant public reaction can be expected. At 1.0 to 1.5 lb/ft^2 public reaction is probable. However, in sparsely populated and quiet areas not accustomed to sonic booms, they may be less tolerated. The responses undoubtedly will depend on individual natures and history of exposure to sonic booms.

At the present time, as in the past, sonic booms are a likely irritation to outdoor recreationists, and increased frequency such as coming in clusters certainly would add to the irritation. It is difficult to assess how often a recreationist must be startled by sonic booms before their reaction turns from passing interest to irritation.

As had been mentioned already, there exists a considerable history of sonic boom incidents over the TRC region. Important species identified

as occupying these ranges are: Pallid kangaroo mouse, mule deer, Desert Bighorn Sheep, American pronghorn, wild horses, and wild burros. Importance of structure behavior has been mentioned already as it relates to the reproductive model (Appendices B and C) and as reviewed in EPA-NTID300.5 (U.S., 1971) and Bell (1972). Generally, the most delicate and sensitive behavior of animals is that associated with reproduction, since this has evolved specifically to insure the species' survival. Unfortunately, neither the impact on reproductive behavior modification nor observed animal responses to previous sonic booms in this region has been satisfactorily related to the likelihood of successful reproduction. For wild animals, only descriptive accounts of individuals in the breeding population have been offered.

These possible behavioral modifications are difficult to assess under natural conditions in the field, particularly as the frequency of occurrence increases during the TRC development. It seems likely that increased numbers of sonic booms coming in clusters (from ACM exercises) presents a new stimulus for evaluation of behavior modifications among exposed birds and mammals.

The limited data available do not show that big game animals have their behavior altered by sonic booms or simulated sonic booms in any appreciable way, although they may show momentary concern (Bell, 1972). Panic reactions are apparently very rare. Desert Bighorn Sheep have been observed to offer no reaction to single sonic booms. Multiple sonic

booms repeated several times a day with increasing frequency might possibly cause mule deer to become edgy and move around more, but such activities may or may not influence or change breeding behavior activities.

Although domestic livestock and horses have been observed during exposure to sonic booms, their reactions have not been conclusive; in most cases, they respond only to the recognition of a sound stimulus. The magnitude of animal responses have generally been slight, even to only a matter of ear twitching. But, future TRC activities suggest a potential clustering of sonic booms over the range areas, providing a rather different type of stimulus. Responses to these clusters can hardly even be conjectured at the present time.

Data on sonic effects on birds are also scarce. Bell (1972) urges the need of experimental data on birds, especially with any significant increase in frequency of exposure. Data on such influences are of particular interest during the egg laying and hatching periods. It has been asserted that in Germany the failure of Osprey eggs to hatch is a result of embryo mortality due to sonic booms (Moll, 1959).

Real concern exists over secondary problems resulting from temporarily disrupting nesting birds. Nesting ducks have been startled and flushed from nests by sonic booms as frequently as ten times per week. The problem here results not from the actual flushing but factors

following that. Normally, when waterfowl leave nests, they cover their eggs to reduce the risk of aerial predators. Such precautions are not taken when the ducks are startled and leave immediately, but instead they defecate on their eggs. The combined effects of (1) no parents present, (2) uncovered eggs, and (3) defecation about the nest will tend to increase predation on eggs by both aerial predators, such as gulls, and mammals, such as skunks. Uncovered eggs will also be exposed to significant periods of solar radiation, which is known to kill embryos at certain critical development stages.

As with the behavioral responses to sound from sonic booms, there are practically no data on the direct effects of overpressure on animals. Bell (1972) refers to the data on massive hatching failure of Sooty Terns on the Dry Tortutga Islands, reportedly caused by overpressures that may have been 100 lb/ft^2 or more. This value is some 20 times greater than the highest overpressure peaks expected for most operations within TRC airspace. However, an aircraft traveling 200 feet above the ground level could generate an overpressure from sonic booms of 40 lb/ft^2 directly under the aircraft which conditions are not necessarily prohibited within the restricted areas. A potential problem may exist in some bird species which have accumulated high body burdens of chlorinated hydrocarbons, resulting in the thinning of egg shells (Cade, et al., 1971). We have observed that in some raptors with thinned eggshells, the weight of the incubating female has caused egg breakage. However, there are no data on which to conclude that sonic booms can cause similar damage to uncovered, weakened eggshells.

Overpressure damage to fish would seemingly be negligible. Cook, et al., (1972) suggest that even when overpressures exceed background noise pressure by a factor of 100, it is still much less than pressures known to harm marine life in single exposures. However, overpressure data relating to fish living in shallow streams, such as those in the Pluvial White River Drainage, are needed before any effect, or lack of it, can be documented. Several of the fish species of concern are small minnow-type fish such as the Moapa Dace, and little is known of their sensitivities. The current data (Cook et al., 1972) suggest that sonic boom pressures can be expected to exceed the ambient noise pressures, at least momentarily, by up to 50 db from the surface down to depths of a few hundred feet, between frequencies of 0.5 to a few hundred hertz. Fish in shallow streams will very likely sense levels, but the consequences cannot be determined at the present time for past, present, or future exposures.

As far as dairy and beef cattle are concerned, overpressures of 2.6-0.75 lb/ft^2 have apparently had no effect (Bond, 1972). It is rather unlikely that overpressures will affect mule deer, Desert Bighorn Sheep, American antelope, wild horses, burros, or domestic livestock.

Although the direct response to overpressures from sonic booms is not unlikely to cause measurable behavior interference or direct damage, prey species might possibly increase their risk to predators by responding in any manner to overpressures such as an ever-so-slight movement.

Only recently has work been initiated on the response of animals to noise, not to mention the effects of sonic booms per se (USEPA-NTID300.5, 1971). Some attention has been given to farm animal response to uncontrolled noise such as sonic booms; in some cases, definite negative prompt responses have been demonstrated, although recovery was always rapid and seldom resulting in measurable effect. During 1961 to 1970, 238 sonic boom animal claims were filed with the U. S. Air Force, 98 of which were settled and received payment (Bell, 1971). Most of the claims were made for farm animals.

During the course of these early investigations, data were gathered on animal responses to sonic booms. The summary of the available data are well-documented and presented by Bell (1971) and USEPA-NTID 300.5 (1971). Bell abstracted these data with:

> Individual domestic or pet animals may react to a boom, a simple startle response being the most common reaction. However, specific reactions differ according to the species involved, whether the animal is alone, and perhaps whether there has been previous exposure. Occasional trampling, moving, raising head, stampeding, jumping, and running are among the reactions reported. Avian species occasionally run, fly, or crowd. Reactions vary from boom to boom and are not predictable. Animal reactions to booms are similar to their reactions to low-level subsonic airplane flights, helicopters, barking dogs, blown paper, and sudden noises. Conclusive data on effects of booms on production are not available, but no change in milk production by one dairy herd was noted. The reactions of mink to sonic booms have been studies in considerable detail. Female mink with kits may be altered, pause in activity, and look for source of sound. Sleeping females may awaken and mating pairs may show momentary alertness, but the mating ritual is not disturbed. No wounding, killing, carrying, or burying of kits in nest by females have been observed in the studies. In one series of observations, the reactions of the mink to barking dogs, truck noises, and mine

blasting were similar to their reactions to booms. The effect of booms on eggs being hatched under commercial conditions was examined in detail, and no effects on hatchability were found. However, a mass hatching failure of the Dry Tortugas Sooty Tern occurred in 1969, and the circumstantial evidence suggests that physical damage to the eggs by severe sonic booms causes by low-level supersonic flights was responsible. Observations on wild and zoo animals are quite limited, but those made on deer, reindeer, and some zoo animals revealed no reaction or only minimal and momentary reaction, such as, raising the head, pricking the ears, and scenting the air.

A report submitted to the Environmental Protection Agency (EPA) by Memphis State University (USEPA-NTID 300.5, 1971) places the possible effects of noise into two categories; (1) interference with behavior signals and (2) direct effects on the animal. Noise that would interfere with behavior would generally be in a frequency range that would tend to "jam" the signals, while direct effects would likely come from persistent exposure to high intensity of sonic booms. This report summarizes its findings with:

> Clearly, the animals that will be directly affected by noise are those that are capable of responding to sound energy, and especially the animals that rely on auditory signals to find mates, stake-out territories, recognize young, detect and locate prey, and evade predators. These functions could be critically affected, even if the animals appear to be completely adapted to the noise (i.e. they show no behavioral response; such as, startle or avoidance). Ultimately, it does not matter to the animal whether these vital processes are affected through signal-masking, hearing loss, or effects on the neuro-endocrine system. Even though only those animals capable of responding to sound could be directly affected by noise, competition for food and space in an ecological niche appropriate to an animal's needs, results in complex interrelationships among all the animals in an ecosystem. Consequently, even animals that are not responsive to or do not rely on sound signals for important functions could be indirectly affected when noise affects animals at some other points in the ecosystem. The "balance of nature" can be disrupted by disturbing this balance at even one point.

This summary, generally, suggests possible effects that pertain to the relationships discussed in Appendix B. While such effects of man-made sonic impulses are not known for the long-term, the accommodation of birds, mammals and fish to thunder over the long-term is assured. Also, the species that reside in the TRC area have reached some degree of accommodation with sonic booms.

Aircraft Noise:

Community noise exposure due to Nellis AFB landings and take offs is shown in Figure C-2.

Aircraft operations generate a considerable amount of noise. It is recognized that the public must be protected from noise and other dangers inherent with airbase operations. Though originally sited some distance from its supporting communities, Nellis AFB is beginning to feel the effects of land development.

Recognizing the critical nature of urban encroachment, the Air Force has developed the Air Installation Compatible Use Zone (AICUZ) concept. The purpose of AICUZ is to delineate land use districts and guidelines of compatibility for land areas adjacent to air bases impacted by aircraft operations. The AICUZ proposal for Nellis AFB is based on a methodology developed by the Air Force which analyzes accident potential as well as noise exposure. Land use districts and guideslines have been developed.

The majority of flying activity originating at Nellis AFB takes place northwest of the airfield and is regulated to a northeasterly flow about 90% of the time. The flight paths of aircraft at Nellis AFB are the composite result of several factors, namely:

1. Departure and arrival patterns designed to avoid heavily populated areas.

2. Air Force criteria governing the speed, rate of climb, and turning radius for each aircraft.

3. Proximity to hills and mountains which preclude operations in certain areas.

Operations from Nellis are coordinated with FAA and flight paths are integrated to minimize conflict with civilian aircraft operations at McCarran International Airport, North Las Vegas Air Terminal and other private flying activities. Flight patterns at Nellis AFB are shown in Figure C-1.

NEF values used for planning purposes and for which noise contours for Nellis AFB are shown in Figure C-2, are 30, 35, 40 and 45.

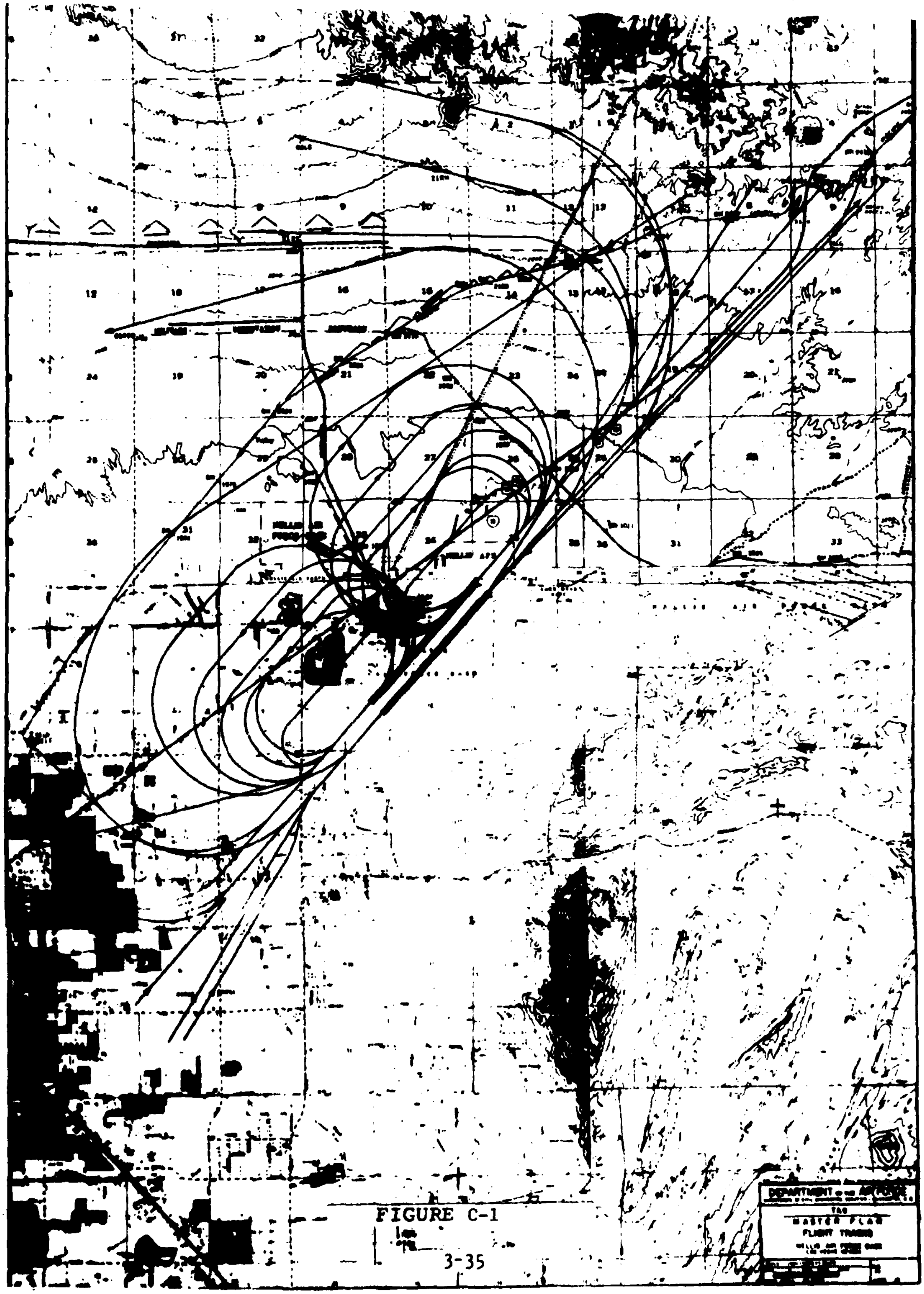


FIGURE C-1

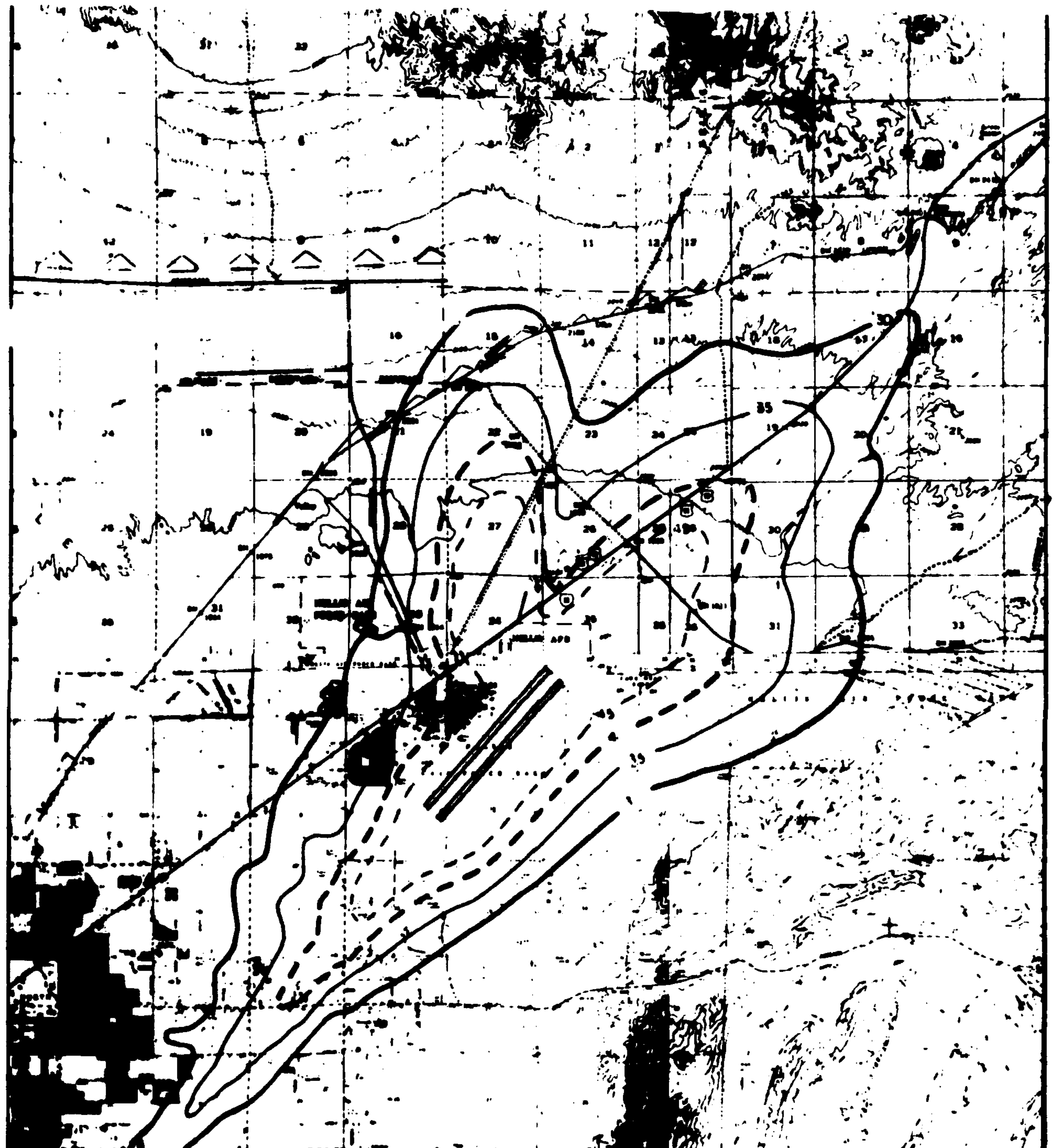


FIGURE C-2

Future planning indicates that the total number of aircraft assigned at Nellis AFB will remain relatively stable. However, the types of aircraft assigned will change as newer ones, such as the F-15 and A-10 are phased in and older aircraft such as A-7, F-105, and earlier models of the F-4 are phased out. In an aircraft for aircraft comparison, the newer ones are quieter than those that are being phased out, i.e., F-15 vs. F-4 or F-105. Further, of the 5500 missions projected over the period of the ACEVAL/AIMVAL project, 2400 are F-5 missions that are drawn from sorties currently flown by the 57 FWW. The remainder 3100 represent additional activity approaching a total of 9 F-14 and F-15 sorties per day during 1977, for an increase of 16%. The 5,000 sorties shown for the EW/CAS project in 1978, are an estimate of the sorties that will utilize the TRC. The nature of this test is such, that the aircraft will be launched from a number of other bases as well as Nellis AFB. The 1978 sorties originating from Nellis are not likely to exceed the level reached in 1977 during the ACEVAL/AIMVAL project although the utilization of the TRC will increase over the period of the ACEVAL/AIMVAL project (page 1-16) with the majority of these missions originating from Nellis AFB. It is projected that future noise levels from aircraft operations at Nellis will not be increased. The introduction of the quieter aircraft will offset the increased number of sorties resulting from the short term ACEVAL/AIMVAL and EW/CAS projects. The net effect is that land areas adjacent to Nellis AFB exposed to noise from aircraft operations will remain essentially unchanged from those presented in the Nellis AFB AICUZ report figure C-2.

No take-offs or landings by military aircraft (except helicopters) will occur within the Tactical Fighter Weapons Center Range Complex during normal activites. Present operations are restricted to subsonic speeds at altitudes less than 5,000 feet above centers of population. There are several proposed threat simulator sites near the towns of Panaca and Pioche. Wild Weasel aircraft in mock attack on such sites may operate with afterburners for short periods when at low-level. Either F-4 or F-105 aircraft may be used. This case probably poses the greatest potential noise intrusion on the population of those two towns.

At a slant range of 10,000 feet with afterburner power, an F-4 would produce a peak noise level of 78 dBA.

The TRC region, prior to any military operations, would probably have been considered a very low background noise area. However, there has existed for the past several years a history of military operations in the TRC region, and it is quite likely that some degree of accommodation to this activity has resulted. Since future TRC plans involve only a modest increase above existing activity, it is not expected that any significant level of noise complaints will arise. In Sadek North where previous activity has been slight, there is a possibility of eliciting complaints concerning TRC activities depending on how quiet the existing background noise levels are in those areas. For example, survey data reported by the Environmental Protection Agency[31] indicates that, on the basis of a 24-hour average, the background noise level of a rural farm area would be 37 dBA and an urban residental area would be 50 dBA. Peak noise levels during the 24-hour period for the same locations were reported at 52 dBA and 69 dBA, respectively. It is against this difference in expected background levels that TRC operations may be expected to generate an occasional complaint from quiet regions. On the other hand, people who locate in rural Nevada in search of quiet and solitude may never quite adapt or tolerate noise intrusions.

Flyovers of small towns at 5,000 feet above aground level and cruise power may produce a peak noise level of 77 dBA. If in the course of a specific mission, engine power settings were to approach afterburner levels when over these small towns, noise exposure levels to the population would be of concern.

Single isolated incidences of high noise exposure may occur whenever a military aircraft flies at low-level over a person (or party) in the field (e.g. prospectors or rock hounds). These occasions may arise anywhere within the uninhabited regions of Sadek North or East where aircraft operations may be as low as 1,500 feet above ground level, or along specified low-level routes where flights are typically less than 500 feet above ground level. At 500 feet altitude peak noise levels may range between 94 and 122 dBA for F-111 and F-4 aircraft depending on power setting. Although the upper value is below the threshold of pain and the duration of exposure is probably too short to cause permanent damage, the exposure of people to this level would be classed as annoying.

Perhaps greater concern would be expressed over possible disruptive effects on the activities people might be pursuing. For example, the Utah State Archeologist, David B. Madsen, notes one incident of damage wherein a low-altitude overflight resulted in a cave-in on a crew involved in an archeological excavation. Unless such a site was directly under an assigned low-level route such an incident would have to be regarded as random. When made aware of plans for new archeological excavation, the Air Force will cooperate to avoid disruptive effects on such activities insofar as TRC objectives are not negated.

The topic of noise has been the subject of several reviews as regards animals. Before discussing noise, it should be pointed out that the major body of data are derived from domestic or zoo-kept animals. Because of this fact, the data are not necessarily valid when applied at face value to wild animals. Most literature suggests that domestic animals are little affected by the sorts of noise generated by jet aircraft. However, low-flying aircraft in close order may present a series of rather different effects. Such exposures have been occurring in the TRC area for many years. Supersonic activity is not allowed on low-level routes but it is possible to mistake noise from afterburner operation; especially afterburner cut-in as a sonic boom. Afterburner operation is allowable on low-level routes, as long as speed and other constraints are met, and thus the low-level flights may be responsible for possible effects on waterfowl. In general, experience with birds of prey suggests that sudden noise, such as would be produced by a low-flying aircraft appearing over a hill, will quickly flush the bird from its nest. Sudden noise when no aircraft is visible could have a similar effect, although visual awareness may be a governing factor in determining the bird's response.

The type of noise produced also has a differential effect on wildlife. For example, nesting hawks, eagles, and falcons are more easily frightened and startled by the noise generated by a piston-driven Sikorsky S-56 helicopter than by a Hiller FH-1100 jet helicopter (White and Sherrod, 1974). It is not clear what the type of noise

generated by a low-flying jet will do to bird populations. While it might be difficult to demonstrate a short-term effect produced by jet noise, there is a possibility that effects will only express themselves on a long-term basis. For example, aircraft and other camp-related activities on the Alaskan tundra had little effect on the population density of adult Longspurs, per se, but a lowered reproductive success was indicated in the disturbance sites over the control sites (L. G. L. Ltd. 1972a). Such an effect, thus, could be detected in the long-term if a lowered population density was observed as a result of the present and continued levels of activity in the TRC area.

Snow Geese on pre-migratory staging grounds can be disturbed by aircraft at elevations up to 10,000 feet where flocks may flush as much as nine miles away from the approaching aircraft. If harassed, they may be driven completely away from areas as large as 50 mi^2 (L. G. L. Ltd. 1972b). The effect on geese may be a function of visual rather than auditory disturbance. There is little doubt but what low-flying jet aircraft will induce a response from birds, but it is uncertain what the effects will be or what degree of accommodation will result except that in the TRC area, past activities have surely reached a significant measure of accommodation. Indirect effect on birds may take place in the form of a reduction of a food source. Insects may be adversely affected by sound (USEPA, NTID300.5, 1971) and in the course of making adjustments may, in turn, have a resulting effect on insect-eating birds. When insects avoid an area or cease moving because of noise, those organisms relying on them for food may leave the area.

The best-documented effect of noise on man or animals, especially well documented with laboratory animals, is the production of hearing loss or damage to the auditory system. Damage can be produced by either a brief exposure to a very loud sound or by a prolonged exposure to moderate levels of sound.

Heretofore, most of the work done with animals, including man, has been done in the range of 100-200 db. Animals apparently have the ability to undergo temporary threshold shifts when exposed to low sound pressure levels of 70-90 db (Peters, 1965) such that they, in a sense, accommodate to noise. Werner (1959) found that noises simulating thunderclaps, with a frequency range of 40-200 Hz at 98-100 db given in rapid succession over a duration of 20 minutes, produced emotional responses in the experimental animal. The responses were measured by analyzing secretions in urine.

Zoo animals appeared to show more "awareness" or concern for moving objects than for sound (Bell, 1972). It may well be the wild animals will likewise be more disturbed by flying jets than by the noise they generate. Certainly when approaching a nesting eagle in a helicopter, visual awareness of the aircraft elicits more reaction than does the sound of the aircraft. Concern would seem to lie in those areas where aircraft are low to the terrain. In these instances, aircraft will be low enough that they could appear to be directly above the animal and thus a threat to it, but there has been insufficient investigation to test and confirm such a hypothesis.

In summary, the data on animal responses to noise are insufficient to enable accurate deductions of potential impacts arising from TRC operations. There is particular uncertainty regarding the effects that might arise from long-term protracted exposures. Furthermore, there has been a history of exposure to the animal populations in the TRC area from previous and existing Air Force activity. If any of the response mechanisms discussed above have been operative throughout the history of exposure, it is quite likely that there has been adaptation and accommodation to it on the part of the natural environment. Little in the way of any adverse impacts from this exposure have been noted, but it would be premature to base any conclusions on this general observation in that there has not been a continuing, comprehensive environmental monitoring of this region. Furthermore, some potential effects, as noted above, may be observed only in the long term, and sufficient time in many cases has not transpired to demonstrate such long-term effects. We should note, however, that in addition to a projected gradual increase in Air Force activity in the TRC region, there will be slight redistributions of activities to areas that have less history of exposure. In such cases, there may occur impacts that could cause some readjustments and accommodations among impacted species and ecosystems.

D -Air Quality

As was previously indicated in that portion of Section 1.D. on air quality, the State Implementation Plan (SIP) of Nevada indicates that air pollutant emissions in Clark County would have to be reduced in order to attain the established air quality standads by 1975. The SIP projected the total annual quantities that pollutant emissions in 1975 should be reduced to in order to attain the standards. In turn, the total annual projected emissions were subdivided among the various sources of air pollutants. As a result, projected allowable emissions were contained in the SIP for aircraft operations, and this category was further subdivided with projected allowable emissions for general aviation, commercial aircraft and military aircraft.

Aircraft distribute their emissions both within and above the mixing layer. Those pollutants emitted on the ground remain within the mixing layer and have their greatest impact on local air quality. Those emissions that occur during flight but within the mixing layer are well mixed with the turbulent atmosphere and are dispersed over a relatively large area. Hence, these pollutants affect the area air quality with little direct effect on the airport and its immediate surroundings. Emissions that occur above the mixing layer are dispersed over an even larger area before reaching ground level and, hence, have little effect on regional air quality. Therefore, the emissions of interest in this Statement are aircraft operations on the ground and during landing and takeoff cycles within the mixing layer.

The Air Force Weapons Laboratory (AFWL) compiled typical mode and time data for specific aircraft as they were used at Nellis AFB in 1970. They also compiled data[32] on pollutant emissions for various Air Force aircraft engines, which show a wide variation in specific pollutant emissions. The 1975 military aircraft emissions presented in this Section were calculated at the Air Force Civil Engineering Center (AFCEC), using their computerized Air Quality Assessment Model. This data was based upon recently submitted operational data and the most current engine emission factors available. The values represent the first computer calculations and as yet have not been completely validated. However, since the data used in these calculations are much more specific, detailed and current than the data used in the 1970 estimates, it is felt that they more accurately depict the actual conditions than did previous estimates.

Typical profiles used by the EPA[33] suggest the following durations for each mode of the landing and take-off cycle for military jets at civilian airports: 6.5 minutes for idle and taxi out, 0.4 minutes for take-off, 0.5 minutes for climbout to 3,500 feet, 1.6 minutes for approach and landing, and 6.5 minutes for idle and taxi in. Although AFWL had identified 11 distinct modes for a normal landing cycle, only the four basic ones were used in the 1970 calculations: idle, afterburner, military thrust and approach power. The AFCEC used nine distinct modes in their calculations for the 1975 estimates. Times estimated by AFWL and AFCEC for climbout were based on 3,000 feet altitude, rather than 3,500 feet, and the times in each mode as estimated by AFWL and AFCEC are greater than those recommended by the EPA. The AFWL and AFCEC values were used in calculating the emissions of military aircraft.

At the time this statement was being prepared the Clark County Health Department, Air Pollution Division, and the Las Vegas Office of EPA were compiling emissions data for Clark County during 1975. While emission levels for general aviation and commercial aircraft, as well as the total emissions for all sources within the county, were available, the data are not published nor validated and are considered best estimates.

The following tables (D-1 through D-5) contain the reported annual total emissions for each pollutant for 1970 and 1975 and the projected emissions (1975 (desired)) that should have resulted in attainment of established air quality standards. In addition, these tables show the 1975 reported and projected allowable emissions, where applicable, for the aircraft sources of pollutants.

Table D-1 reflects that although the total particulate emissions during 1975 were approximately one-third of the 1970 emissions, the 1975 emissions still exceeded the projected allowable emissions necessary for attainment of the established air quality standards. As the aircraft particulate emissions were such a small portion (1.1%) of the 1970 total particulate emissions, there were no projected allowable emissions established for aircraft sources for 1975. The particulate emissions from aircraft during 1975 were much less than those emissions during 1970 and were less than one-half of one percent of the 1975 total of particulate emissions.

No reduction of sulfur oxide emissions was projected as concentrations of this pollutant were below the air quality standards. Table D-2 indicates

TABLE D-1

CLARK COUNTY PARTICULATE EMISSIONS
(Tons/Year)

	Total County	General Aviation and Commercial Aircraft	Military Aircraft	Total Aircraft
1970 (Reported)	89,000[1]	--	--	990
1975 (Desired)	13,114[1]	--	--	
1975 (Reported)	31,950[2]	57.8[3]	77[4]	134.8

1. Air Quality Implementation Plan for the State of Nevada, 30 January 1972, Commission of Environmental Protection, State of Nevada.

2. Clark County Health Department, Air Pollution Division, unpublished data.

3. U. S. Environmental Protection Agency, Las Vegas, Nevada Office, unpublished data.

4. USAF Civil Engineering Center, Tyndall AFB, Florida, unpublished data.

TABLE D-2

CLARK COUNTY SO_2 EMISSIONS
(Tons/Year)

	Total County	General Aviation and Commercial Aircraft	Military Aircraft	Total Aircraft
1970 (Reported)	55,800[1]	--	--	390[1]
1975 (Reported)	33,411[2]	76.2[3]	50[4]	126.2

1. Air Quality Implementation Plan for the State of Nevada, 30 January 1972, Commission of Environmental Protection, State of Nevada.

2. Clark County Health Department, Air Pollution Division, unpublished data.

3. U. S. Environmental Protection Agency, Las Vegas, Nevada Office, unpublished data.

4. USAF Civil Engineering Center, Tyndall AFB, Florida, unpublished data.

TABLE D-3

CLARK COUNTY CO EMISSIONS
(Tons/Year)

	Total County	General Aviation and Commercial Aircraft	Military Aircraft	Total Aircraft
1970[1] (Reported)	160,000	1,115	5,827	6,942
1975[1] (Desired)	83,092	964	5,535	6,499
1975 (Reported)	123,712[2]	2,569[2]	2,367[3]	4,936

1. Air Quality Implementation Plan for the State of Nevada, 30 January 1972, Commission of Environmental Protection, State of Nevada.

2. Clark County Health Department, Air Pollution Division, Unpublished data.

3. USAF Civil Engineering Center, Tyndall AFB, Florida, unpublished data.

TABLE D-4

CLARK COUNTY HC EMISSIONS
(Tons/Year)

	Total County	General Aviation and Commercial Aircraft	Military Aircraft	Total Aircraft
1970[1] (Reported)	47,300	423	2,033	2,456
1975[1] (Desired)	18,254	119	1,584	1,703
1975 (Reported)	21,916[2]	974[2]	497[3]	1,471

1. Air Quality Implementation Plan for the State of Nevada, 30 January 1972, Commission of Environmental Protection, State of Nevada.

2. Clark County Health Department, Air Pollution Division, unpublished data.

3. USAF Civil Engineering Center, Tyndall AFB, Florida, unpublished data.

that the 1975 emissions were substantially less than during 1970. During both 1970 and 1975 aircraft emissions were less than one percent of the total emissions of sulfur oxides.

Table D-3 indicates that although the total emissions from all sources of carbon monoxide during 1975 were less than in 1970, the 1975 emissions exceeded the projected allowable emissions necessary for attainment of the air quality standards. The general aviation and commercial aircraft reported emissions of this pollutant exceeded the projected allowable emissions during 1975. However, the military aircraft reported emissions were only about 43% of the projected allowable emissions for that source in 1975. As a result, the total reported emissions from all aircraft sources were less than the projected allowable emissions of carbon monoxide in 1975 and were approximately four percent (4%) of the total 1975 emissions from all sources.

Table D-4 shows that although the total reported emissions of hydrocarbons from all sources in 1975 were less than one-half of the reported 1970 emissions, the 1975 emissions still slightly exceeded the projected allowable emissions. The general aviation and commercial aircraft emissions of this pollutant in 1975 exceeded the projected allowable emissions. However, the military aircraft hydrocarbon emissions during 1975 were only about 31% of the projected allowable emissions for that source in 1975. Consequently, the reported emissions from all aircraft sources during 1975 were less than the projected allowable emissions for hydrocarbons. The total aircraft hydrocarbon emissions were 6.7% of the total emissions from all sources during 1975.

Table D-5 reflects that the 1975 reported emissions of nitrogen oxide from all aircraft sources exceeded the emissions during 1970. The total aircraft emissions were only 1.7% of the total emissions from all sources during 1975. The total reported emissions of nitrogen oxide during 1975 were less than the projected allowable emissions necessary for attainment of the air quality standards.

The SIP indicated that total aircraft emissions of carbon monoxide and hydrocarbons must be reduced in 1975 to projected allowable quantities in order to attain the established air quality standards. For both these pollutants, the 1975 military aircraft emissions were less than one-half and one-third, for carbon monoxide and hydrocarbons respectively, of the projected allowable emission quantities from this source. For the other three pollutants, the SIP did not establish limits on the quantities of aircraft emissions because the concentrations of these pollutants were within the air quality standards and/or the aircraft emissions were such a small percentage of the total emissions from all sources.

In addition, the SIP projected that further reductions in aircraft emissions, particularly for military aircraft and general aviation, would be required by 1977 in order for carbon monoxide and hydrocarbon emissions to meet air quality standards. For carbon monoxide, the projected allowable emissions from military aircraft is reduced to 5,431 tons during 1977. The reported emissions of 2,367 tons of carbon monoxide in 1975 is still less than one-half (approximately 44%) of the projected allowable reduced emissions in 1977 for military aircraft. For hydrocarbons, the reported 1975

TABLE D-5

CLARK COUNTY NO_2 EMISSIONS
(Tons/Year)

	Total County	General Aviation and Commercial Aircraft	Military Aircraft	Total Aircraft
1970[1] (Reported)	83,400	--	--	775
1975[1] (Desired)	76,764	--	--	--
1975 (Reported)	69,708[2]	749[2]	459[3]	1,208

1. Air Quality Implementation Plan for the State of Nevada, 30 January 1972, Commission of Environmental Protection, State of Nevada.

2. Clark County Health Department, Air Pollution Division, unpublished data.

3. USAF Civil Engineering Center, Tyndall AFB, Florida, Unpublished Data.

emissions of 497 tons from military aircraft is one-third (33-1/3%) of the projected allowable emissions of 1,491 tons from that source in 1977. Although present plans provide for some increase in aircraft operations at Nellis AFB by 1977, and consequently some increases in air pollutant emissions, they would not be of the magnitude required to double or triple the 1975 emissions of carbon monoxide and hydrocarbons and meet or exceed the projected allowable military aircraft emissions for 1977.

Table D-6 of Section 1D showed that reported emissions of particulates and sulfur dioxide in Nye and Lincoln counties were far below the Clark County emissions of these pollutants. The SIP concluded that concentrations of all air pollutants in Nye and Lincoln counties were within the air quality standards.

Therefore, it can be concluded that air pollutant emissions from military aircraft operations, both at present and the near future, do not result in significant adverse impact on the air quality of the three southern Nevada counties where the TRC is located.

It should be noted that an Air Force effort has been initiated to reduce visible and other emissions from Air Force aircraft. One such project is described in a report by the Aero Propulsion Laboratory entitled, Assessment of Pollutant Measurement and Control Technology and Development of Pollutant Reduction Goals for Military Aircraft Engines (AFAPL-TR-72-102). In a more recent Aero Propulsion Laboratory study reported in Aircraft Exhaust Pollution and its Effect on the U. S. Air Force

(AFAPL-TR-74-64), appraisals were made of the capabilities of current and advanced technologies to reduce emissions of military aircraft. Although a variety of both current and future technologies show promise of significantly reducing emissions, it was estimated that five years would be required before the required retrofits employing current technology could be made to USAF aircraft. Advanced technology applications would require up to 12 years before effective implementation would result. These programs are designed to reduce aircraft emissions and will be implemented even though emissions are presently consistent with the schedule of reductions required by the State Implementation Plan.

E - TRC Ground Activities

The primary construction in the TRC involves some roads and instrument trailer pads. Fortunately, most of the extended field roads necessary are already present; thus, only small sections of access roads are anticipated for future TRC development. This will reduce road construction and the concomitant impact to a bare minimum. Road and other constructions in undeveloped environments may cause several results:

1. Increased off-road recreational activities.
2. Increased erosion potential.
3. Dispersion of solid wastes into new areas.
4. Additional dust.
5. Disruption of certain wildlife habitats.
6. Disruption of remote plant and animal refuges.
7. Increased potential for disrupting breeding and nesting behavior.
8. Increased human access and possible fire and vandalism.
9. Damage to archeological values.

If any of these become excessive, the results could become a matter of concern. With the road system already present, it is unlikely that many of the hazards mentioned above will become serious.

Perhaps Item 6 above has the greatest risk attached. Care will be taken to avoid road or instrument pad construction that would necessitate accessing the habitats of any member included among the important checklisted species. Opening these areas to easy public use could have uncorrectable consequences in a few years or generations, particularly with plants such as the Bristlecone Pine. Item 7 is particularly important when considering species with nervous nesting habits, such as the Golden Eagle. Eagles, and several other species, will readily abandon a nest when repeatedly disrupted, and possibly break eggs in the process. Some will even eat their young when disrupted excessively.

Perceived impacts will be avoided as much as possible with appropriate environmental consultation and careful engineering. In the surveying of new roads, or instrument pads, care will be taken to avoid undesirable pollution. Should the instrument pads have to be secured, they will likely be either temporarily posted with closed roads, or fenced. Any new roads will be planned so as not to restrict ranchers from their necessary activities.

Generator noises provide a general nuisance to human and wildlife alike, but they seem to accommodate to it rather rapidly. There will always be avoidance behavior displayed by certain shy species, particularly those with strong mobility such as coyotes and bobcats. Insofar as possible, effort will be taken to reduce the generator noise in hunting areas during hunting seasons. Generally, generator noises, a very local effect, will probably be insignificant.

There exists the possibility of killing animals with either live or inert ordnance applications. Two important species may be exposed to this potential hazard (Dark kangaroo mouse, M. m. sabulanis and Pallid kangaroo mouse, M. p. ruficollaris) since small portions of their geographic ranges are found in the North Range.

Fire caused by live ordnance has the potential of removing relatively large areas of vegetation especially during those infrequent years when there is abnormal fire fuel build-up (high productivity). This occurs during years of high fall precipitation, with pregermination of ephemeral species, followed by adequate spring moisture to cause heavy growth. The heavy growth of these species produces the fuel for fire. Some species involved are Red Brome (Bromus rubens), Fiddleneck (Amsinkia spp.) and Red Stem Filaree (Eurodium cicutarium) and on previously disturbed soils Russion thistle (Salsola kali). In view of the fact that some of the 20mm ordnance are tracers, there is a possible hazard of fire. However, air-to-air and air-to-ground gunnery activity is carefully controlled and there are no known instances where the Air Force has been responsible for any of the fires that have occurred on the Desert National Wildlife Range (shared with the South Range). No increase in this type of ordnance expenditure is planned for the TRC.

Protection of archeological values is an important undertaking and is prescribed by several federal laws governing antiquities and

historic sites. In general, archeological values can be lost through inadvertant destruction while pursuing excavation and other activities on the ground. Such incidences are most likely to arise because the site was previously unknown and unrecorded. To preclude such happenings it is important to have a competent archeologist conduct surveys and investigations before any significant excavations take place where there is a likelihood of finding significant archeological values. Particular attention will be paid to the possibilities for uncovering significant historical or archeological values where there is already evidence of previous human activity. Several such sites in the Desert National Wildlife Range and one on Mt. Irish have been nominated for listing in the National Register. In any case, where archeological discoveries are made or are strongly indicated, first priority will be given to choosing alternate sites provided TRC objectives are not compromised. If an alternate site which meets with TRC objectives cannot easily be found, consideration will next be given to careful salvage operations.

SECTION FOUR

ALTERNATIVES

The alternatives to the TRC proposals are no action, reduce the scope of operations or move the entire operation to another location.

A - No Action

In the past, the capability of the United States Air Force to accomplish its wartime mission has often been dependent on weapon systems that have never been tested and evaluated in an operational environment of the type expected when required to engage the enemy. Similarly, the aircrews that utilize these weapon systems have not, in many cases, received adequate training for their employment. This condition has historically caused a high loss rate of manpower and equipment during the early days of a war. A study made of World War II and the Korean War revealed that the first ten combat missions flown by our aircrews were the most hazardous. Results of this study were substantiated by our experiences in the Vietnam War.

To alleviate this condition, a capability must be provided to operationally test and evaluate new weapon systems, and permit aircrew combat training, under conditions that simulate, as nearly as possible, an actual enemy scenario. This mission has been assigned to the Air Force's Tactical Fighter Weapons Center (TFWC) located at Nellis Air Force Base in Nevada. The TFWC accomplishes this mission through its two major subordinate units; Familiarization with new weapon systems and their employment is not enough. Realistic

training sorties, combining integrated activities across the full spectrum of tactical operations, must become a way of life during peace and war. To be effective, this additional training must provide for basic weapon systems employment, near-real combat practice, and a measurement capability to determine aircrew and weapon effectiveness under varying situations. Complementary to the need for realistic training and practice is the need for adequate test and evaluation of the weapon systems provided to aircrews.

The deficiencies of the existing TRC to fully support realistic training and testing stem from:

a. a lack of integrated air defense environment that is representative of a network of foreign ground and air defense systems.

b. a lack of airspace and freedom that permits unconstrained employment of penetrator tactics, including electronic warfare to counter the enemy's command, control, and weapon guidance systems.

For the foregoing reasons the course of no action was not considered a viable alternative.

B - Reduce Scope of Operations

This could be accomplished by either deleting the airspace training areas (ATCAAAs) or deleting the North Range and/or the South Range restricted areas (Figure A-2, Section One).

Airspace Training Areas:

Deleting the airspace training areas would leave only the two restricted areas for air-to-air combat training. Neither restricted

area is large enough to accommodate multiple aircraft (four or more) air-to-air engagements. This would therefore preclude large-scale operations, such as Red Flag, which would have to then be accomplished elsewhere. Loss of the Alamo and Elgin areas would be detrimental to the 57th Fighter Weapons Wing whose "Fighter Weapons Instructor Course" relies heavily on those areas for student combat training. Loss of the Alamo area would force relocation of the Air Combat Maneuvering Instrumentation (ACMI) system since the South Range airspace is not large enough. This would require that the ACEVAL/AIMVAL project (Section 1B) also be moved to another location. Loss of the Caliente area would cause relocation of the Electronic Warfare Range. Loss of the Coyote area could have a major effect on some tenant units at the Nevada Test Site.

As stated above, loss of all or any portion of the airspace training areas would have a major effect on military operations at the TRC. Any such action would cause a corresponding reduction of Nellis AFB activities and could result in the relocation of personnel and equipment to another part of the country. Such a relocation would be very expensive and would certainly affect the capability of our aircrews to maintain a high state of combat readiness.

Restricted Areas:

Deleting both the North Range and South Range restricted areas would preclude any air-to-ground bombing and gunnery training. Since all tactical fighter units must maintain an air-to-ground capability, both

the 57th and 474th Wings would have to be moved to another location which would probably force closure of Nellis AFB.

Loss of the North Range restricted area would preclude effective utilization of the Air Force's 1,500,000 acres which is the only existing Air Force property large enough to establish realistic enemy target complex areas. Therefore, a new landspace area of about the same size would have to be acquired to maintain the present capability for large-scale combat training operations. A portion of Nellis manpower and equipment would have to be moved to the new range location.

Loss of the South Range restricted area would cause closure of the instrumented range for testing and evaluation of new weapon systems, the two air-to-ground bombing and gunnery practice ranges and the ACMI system. Such an action would also force relocation of some Nellis manpower and equipment.

C - Move to Another Location

New landspace and airspace would be required to move the TRC operations to another area, which may or may not be available. In any case, the move would be extremely expensive in view of the ever-increasing value of land throughout the country. Loss of the TRC would force relocation of the 57th and 474th Wings, with a probably closure of Nellis Air Force Base.

SECTION FIVE

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

A - TRC Airspace Proposal

Airspace actions are quite fluid and even reversible in nature. It is thus difficult to imagine any permanent or even long-term unavoidable adverse impacts resulting from implementation of the proposed TRC airspace.

If any adverse impacts appear, they can be mitigated through one of several processes. The USAF could provide:

1. A thorough indoctrination, on as wide a geographical basis as possible, to inform pilots of the nature and general schedules of TRC activities.

2. A specialized indoctrination of all pilots who operate in the area to establish an understanding of TRC activities in terms of operational safety.

3. A thorough dissemination program through the FAA, pilot's groups such as the National Pilots Association (NPA) and the Aircraft Owners and Pilots Association (AOPA) to develop pilot awareness and understanding of TRC operations. FAA agents, tower operators, and center controllers will also be informed about TRC airspace operation.

In order to deal equitably with the potential impacts on Fixed Base Operators (FBOs), the Air Force could request the FAA to begin air traffic surveillance studies to determine the degree to which FBOs may be affected by TRC activities. The goal of such studies would be to establish a quantitative base from which to assess monetary losses to FBOs due to TRC induced air traffic diversions and the like.

B - Ordnance Accumulations

TRC operations involve the use of substantial quantities of live and inert ordnance. As in the past, these activities result in accumulations of the spent parts and the occasional duds and misfires. In most cases (except for perhaps air-to-air gunnery discharges of 20mm ammunition), the ordnance deliveries to the ground are well controlled and the unavoidable consequences of spent ordnance accumulations are minimized.* However, as discussed in Appendix D, desert environments have such low turnover rates, that should spent ordnance accumulations prove harmful to the environment, such a fact may not be found out until many tens of years have passed.

Ordnance deliveries on the TRC will continue to be performed as they have for the past 35 years. Consequently, spent ordnance will accumulate primarily in target areas where there has been an accumulation from activities of the preceding years.

*Existing Nellis ordnance expenditure activities are discussed in Section 1B.

In North Range target areas new target sites will be established periodically. Thus, whenever ordnance is expended on these new targets, a small new area of range land will begin to accumulate spent ordnance. However, the degree of ordnance usage of these North Range target areas is not well defined. Nonetheless, if range policing is not adequate, this live ordnance usage may render such target areas unusable for many other potential applications. Possible measures to mitigate these consequences would appear to involve either less use of ordnance, whether inert, practice or live, or better range policing measures. Clearly, great potential exists for improving upon the recovery of spent ordnance and greater investment in personnel and devices to help locate buried and partially buried fragments may be justified. These considerations must be balanced against the benefits of better policing. As long as the accumulations can be kept to isolated areas which have already been used, the benefit of reducing the rate of accumulation may be marginal.

C - Electromagnetic Radiation

The operation of pulsed emitters of relatively high power such as some of the TRC threat simulators is not expected to pose a problem to wearers of prosthetic devices, such as cardiac pacemakers. It has already been noted that the operations of the threat simulators will come under the purview of stringent TRC safety procedures which should eliminate any risk to cardiac pacemaker patients.

Electronic Warfare (EW) activities will continue in the Caliente and North Range areas at about the same level; however, additional and different threat simulator hardware will be brought into use. The use of each new piece of equipment will be scrutinized carefully for any potential effects its use may entail.

Electromagnetic emanations from TRC EW activities can potentially interfere with the operation of many non-participating receiving equipments. The number, types, characteristics, and specific details of location of these receivers provides a situation of such complexity that precise prediction of impacts is difficult. Calculations show that under most EW circumstances, there would very likely be significant interferences in non-participating equipments if no precautions were taken. The degree and range of the interfering effect depends as well on the way in which the EW activity is planned and timed. The planning and carrying out of a particular TRC activity must also take care to guarantee that the test objectives are not compromised by self-interference from the many different TRC transmitters that will be in operation.

For these reasons, a frequency management capability has been established which causes each test activity to be screened for proper frequency coordination and electromagnetic interferences. The TRC frequency management activity includes participation in all range scheduling, engineering of all range frequency requirements, coordination with all government and nongovernment frequency management agencies as

required participation in the development of frequency plans for TRC exercises, real-time frequency control and scheduling for tests, electromagnetic compatibility analysis and consultation, and interference resolution. Additionally, a frequency monitoring capability will be obtained. Coordination, clearance, and assignment of frequencies for electronic warfare emitters will be a paramount task of the TRC frequency management activity. It is expected that these procedures should acceptably mitigate adverse electromagnetic interferences in non-participating equipments.

D - Reproduction Losses

No clear cases of avoidable adverse impacts on the natural environment have been established. However, this situation could be due as much to the lack of data and basic research concerning the behavioral responses of the various species as it is due to demonstrated lack of impact. The requirement for quantitative appraisals of natural environmental responses to TRC activities within a total ecosystem context is discussed in Appendix B. Also, by way of example, in Appendix C the calculation of the sensitivity of the Bighorn Sheep population to small changes in reproduction rate shows that impact, though small, acting through the reproduction mechanism may ultimately produce significant impacts. However, these sensitivities are such that ordinary random fluctuations in population caused by variations

in such thing as forage supply may make it difficult to detect impending impacts and their true causes.

In the same way that impacts on reproduction may affect the population of a single species, so can other impacts materialize by induced effects propagating through sensitive links in an entire ecosystem. Because of the climatic and other restrictions that constrain desert ecosystems there may be a greater proportion of sensitive links in these ecosystems. Without undertaking comprehensive and detailed investigations to determine ecosystem sensitivities, it is difficult to determine which are the sensitive links.

With regard to these sensitive links, ecosystems which include the important checklisted species of the TRC area are of primary interest. In an effort to mitigate or even avoid potential adverse impacts on the natural environment of the type discussed above, the Air Force will consider cooperative efforts with State and Federal wildlife managers to improve the quality of environmental monitoring within the TRC.

SECTION SIX

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

An issue involved in relating short-term and long-term of the TRC environment centers on the concept of the biological turnover rates of environments. Turnover rates are used to describe the rates at which elements of the environment change. Rates of growth (productivity) are often used as indicators for turnover rates, however, the latter may generally be considerably slower. As an example, the growth rates in tropical forests have been documented to be about two orders of magnitude greater than that of deserts or tundra. As a result, it may be inferred that desert turnover rates are at best 100 times lower than those of tropical forests. This concept is developed in Appendix D.

The relationship between turnover rates and TRC activities is best described by the example of ordnance that is expended and then left on the range. Any lead in this ordnance will turn over; that is, it will be assimilated by the desert environment, but very likely only over a period of several hundred years. The effects of this assimilation can, of course, only be measured after the fact. Of concern, then, are such possible long-term effects of such activities.

As has already been pointed out, the direct effects of ordnance expenditure under TRC will be pretty much constrained to areas already similarly contaminated by past activities. Although TRC will add to these amounts, it is reasonable to assume that the past actions have already constituted a probable long-term effect of the type just discussed.

A specific example of effects which persist for shorter periods is the erection of building or other "permanent" structures. In most TRC instances, such structures will be erected in already developed areas of the desert. In cases where undeveloped land becomes a construction site, these short-term effects will generally be controllable by TRC. By this, we mean that a concrete slab (required for example for a fixed radar mount) could be removed with relative ease if and when the TRC mission is no longer required.

SECTION SEVEN

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES THAT ARE INVOLVED

The use of range lands for the expenditure of ordnance constitutes perhaps the only significant irretrievable commitment of resources. The resource is the land area in which expended ordnance (fragments and potentially live ordnance) accumulates. The commitment is essentially irreversible in that these portions of the range are not safe for many of the other normal uses made of this kind of range land, most notable grazing. However, much of the existing ordnance expenditure is constrained to occur in dry lake beds which have virtually no capability to support cattle grazing. The mineral values within these dry lake beds is not established, but is thought to be negligible.

The commitment of resources in this sense is essentially the result of past and present activities on the existing ranges. Except for the periodic construction of new target sites, the effect of future TRC operations will be insignificant in terms of the commitment that has already occurred.

SECTION EIGHT

CONSIDERATIONS THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS

The most significant offsetting factor that will result as an effect of future TRC development is the increased safety of operation that will be made available to all pilots wishing to use TRC airspace. This will be especially true when TRC development is completed with respect to the air traffic control instrumentation that will be installed to meet its own needs. Offsetting considerations of existing land restrictions in aiding wildlife management are also important.

The major objective of the proposed TRC airspace is "mission accomplishment with safety." Because of this goal, two related offsetting factors emerge as a result of the proposal.

1. Safety: By exercising an ATC capability in the TRC area, the safety of many operations within this area will be enhanced. Even if the frequency of military operations in the area is increased, by segregating air traffic in both time and space, an orderly and safe interaction of both civilian and military aircraft can be achieved.

2. Communications and Surveillance: Part of the TRC Airspace Proposal depends on the development of communications and surveillance capabilities. The Range Control Center (RCC) will become the nerve

center for all TRC operations. In addition to interfacing with the FAA on a broad range of ATC issues, the RCC will, in the future, develop the capability to control air traffic in TRC airspace. To do this efficiently, the RCC will require communications and surveillance systems with good low-level coverage of TRC airspace. These systems will enhance the safety and efficiency of flight in TRC airspace by permitting the RCC to provide ATC services which are not available today.

Although no new lands are to be excluded to human entry as a result of TRC activities, the restrictions on the existing TRC ranges are to continue. The existing restricted area in the TRC North Range overlaps the BLM designated *Wild Horse Range*. *One of the problems* in managing wildlife ranges occurs with poachers and other unauthorized or illegal takings of the animals. Wild horses compete for range forage with freely grazing, domestic cattle and consequently are recognized problems for some ranchers. The restricted land areas of the TRC pose problems for poachers and may provide non-competitive range sanctuaries and consequently can be helpful in the management of the wild horse herds. However, the restricted lands may also pose barriers to wildlife managers in performing the field operations necessary to discharge their duties. The manager of the Desert National Wildlife Range expressed the opinion that such restrictions are probably helpful in the management of the Bighorn Sheep herds frequenting the

TRC South Range. The Air Force has negotiated Memoranda of Understanding with both the BLM and the U. S. Fish and Wildlife Service to provide for wildlife management operations on restricted lands.

Interests of other agencies in the TRC extend primarily to procedures for airspace rule-making and land withdrawals which are the Federal Aviation Administration and the Bureau of Land Management, respectively.

The FAA Administrator is manager of all U. S. airspace. In those cases in which some unique use of airspace is required, the Administrator may designate the airspace in terms of a level of restriction and will in these cases designate a user or using agency who is then entitled to enjoy the benefits of the designation. In order to have the Administrator designate airspace, the future user must present an Airspace Proposal to the FAA. The FAA then processes the Airspace Proposal in accord with the Administrative Procedures Act.

Consideration of withdrawal of even very small portions of land (for emitters, receivers, communications relay towers and instrumentation sites) is the most permanent and therefore the most constrained by formal procedures. Federal agency heads may request withdrawal or reservation of land. If it is for national security reasons, the application must be submitted to the Secretary of Interior.

The land to be withdrawn must be described in detail. The purposes must be described (if for national security purposes, that purpose must be so stated) and statements must be made concerning the possibility of contamination of the land by the proposed use and length of withdrawal period, impact of use on other federal regulations having to do with the resources of the area, and impact on water rights. Finally, the applicant agency must state its legal authority to withdraw the land and provide a justification for the proposed withdrawal or reservation, including statements showing the need for all the area requested and for the limitation, if any, of concurrent uses.

If the area to be withdrawn is in excess of 5,000 acres, there are certain additional requirements involving maps showing legal subdivisions, statements regarding proposed utilization of the property, location of improvements, and any cultural or other features of the lands requested and of the surrounding area deemed by the applicant to be significant and illustrate the need for and effect of the proposed withdrawal.

Notice of withdrawal must be published in the Federal Register and publicity must be given to the proposal. If there is sufficient protest or if it is deemed in the public interest by the appropriate officer of the BLM, a public hearing may be held. Costs will be borne by the applicant agency. The BLM makes its own investigation of the proposed withdrawal to determine the existing and potential

demand for the lands and their resources. BLM officials will negotiate with the applicant to reduce the size of the withdrawal to a minimum essential to the applicant's needs and providing for maximum concurrent utilization.

The authorized officer of the BLM makes his findings of fact and conclusions on the application. If the applicant does not concur, he may appeal to the Director of the BLM, the Secretary of the Interior, and, under certain circumstances, to the Office of Management and Budget.

Allowance of a withdrawal will be conditional upon the payment by the applicant agency or upon agreement of the applicant agency to pay to the owner or owners of range or other improvements placed upon the lands pursuant to an agreement with the United States such amount and at such times as the authorized official of the Bureau of Land Management deems fair and reasonable under the circumstances and the terms of such agreement to compensate for the loss of the improvements, providing that the applicant agency is authorized by law to make such compensation. In addition, a holder of a grazing license or permit for lands within a grazing district will be compensated for the loss resulting from the use of the lands embraced in the license or permit for war or national defense purposes in an amount to be determined fair and reasonable by, and to be paid by, the head of the department or agency of the Federal Government making such use.

SECTION NINE

DETAILS OF UNRESOLVED ISSUES

Since the TRC was established in 1940, unauthorized grazing has been pursued on the range. The boundary of the range is not fenced which poses a practical problem as well. Several attempts have been made over the intervening years to solve this problem. The owners of the cattle that are in trespass are known and attempts to deal directly with them have not been successful. The Air Force is presently pursuing the possibility of outgranting some portions of the range for authorized grazing. However, some of the grazed lands are under the jurisdiction of ERDA officials who are presently opposed to permitted grazing.

The manager of the Pahranagat National Wildlife Refuge has noted that low-flying aircraft (over or near the refuge) have frequently caused nesting waterfowl to flush. Although no permanent damage to the waterfowl populations has been documented, there is a possibility for such damages. Low-level training flights are an important training exercise in developing aircrew proficiency. Any increase in flight activity anticipated for TRC operations will not cause the number of low-level training flights to increase. Training flights of all kinds will continue in much the same manner as they are conducted today.

APPENDIX A

VERTEBRATE SPECIES AND COMMON PLANT SPECIES FOUND IN THE AREA

1. Sorex merriami leucogenye
   Merrian Shrew

2. Sorex vagrane vagrans
   Vagrant Shrew

3. Sorex tenellus
   Dwarf Shrew

4. Notiosorex crawfordi crawfordi
   Crawford Shrew

5. Myotis yumanensis yumanensis
   Yuma Myotis

6. Myotis evotis evotis
   Long-eared Myotis

7. Myotis volans interior
   Hairy-winged Myotis

8. Myotis californicus stephensi
   California Myotis

9. Myotis subulatus melanorhinus
   Small-footed Myotis

10. Lasionycteris noctivagans
    Silver-haired Bat

11. Pipistrellus hesperus hesperus
    Western Pipistrella

12. Eptesicus fuscus pallidus
    Big Brown Bat

13. Lasiurus borealis teliotis
    Red Bat

14. Lasiurus cinereus cinereus
Hoary Bat

15. Euderma maculatum
Spotted Bat

16. Corynorphinus townsendii pallescens
Long-eared Bat

17. Antrozous pallidus pallidus
Pallid Bat

18. Tadarida brasiliensis mexicana
Mexican Free-tailed Bat

19. Tadarida molassa
Big Free-tailed Bat

20. Sylvilagus idahoensis
Pigmy Rabbit

21. Sylvilagus nuttallii grangeri
Nuttall Cottontail

22. Sylvilagus audubonii arizona
Audubon Cottontail

23. Lepus townsendii townsendii
White-tailed Jackrabbit

24. Lepus californicus deserticola
Black-tailed Jackrabbit

25. Eutamias minimum scrutator
Least Chipmunk

26. Eutamias dorsalis grinnelli

27. Eutamias dorsalis nevadensis
Cliff Chipmunk

28. Eutamias umbrinus inyeonsis

29. Eutamias umbrinus nevadensis*
Say Chipmunk

30. Eutamias palmeri*
Palmer Chipmunk

*The entire range of this species is contained within the TRC.

31. Eutamias panamintinus
Panamint Chipmunk

32. Ammospermophilus leucurus leucurus
Antelope Ground Squirrel

33. Spermophilus townsendii mollis
Towsend Ground Squirrel

34. Spermophilus variegatus robustus
Rock Squirrel

35. Spermophilus tereticaudus tereticaudus
Round-tailed Ground Squirrel

36. Spermophilus lateralis certus*
Golden-mantled Ground Squirrel

37. Thomomys umbrinus brevidens

38. Thomomys umbrinus centralis

39. Thomomys umbrinus nanus*

40. Thomomys umbrinus phelleoecus*
Botta Pcket Gopher

41. Thomomys umbrinus virgineus
Botta Pcket Gopher

42. Perognathus longimembris panamintinus

43. Perognathus longimembris virginus
Little Pocket Mouse

44. Perognathus parvus olivaceus
Great Basin Pocket Mouse

45. Perognathus formosus mohavensis
Long-tailed Pocket Mouse

46. Perognathus formosus incolatus
Long-tailed Pocket Mouse

47. Microdipodops megacephalus albiventer*

*The entire range of this species is contained within the TRC.

48. Microdipodops megacephalus sabulonis*

49. Microdipodops megacephalus megacephalus
Dark Kangaroo Mouse

50. Microdipodops pallidus rufficollaris*

51. Microdipodops pallidus ammophilus

52. Microdipodops pallidus purus*
Pallid Kangaroo Mouse

53. Dipodomys ordii fetosus

54. Dipodomys ordii monoensis
Ord Kangaroo Rat

55. Dipodomys microps centralis

56. Dipodomys microps occidentalis
Chisel-toothed Kangaroo Rat

57. Dipodomys merriami merriami
Merriam Kangaroo Rat

58. Dipodomys deserti deserti
Desert Kangaroo Rat

59. Reinthrodontomys megalotis megalotis
Western Harvest Mouse

60. Peromyacus crinitus stephensi
Canyon Mouse

61. Peromyscus eremicus eremicus
Cactus Mouse

62. Peromyscus maniculatus conoriensis
White-footed Mouse

63. Peromyscus boylii rowleyi
Brush Mouse

64. Peromyscue truei nevadensis

65. Peromyscus truei truei
Pinyon Mouse

*The entire range of this species is contained with the TRC.

66. Onycnomys leucogaster brevicaudus
Northern Grasshopper Mouse

67. Onychomys torridus longicaudus
Southern Grasshopper Mouse

68. Neotoma lepida lepida
Desert Wood Rat

69. Neotoma cinerea acraia

70. Neotoma cinerea lucida
Bushy-tailed Wood Rat

71. Microtus montanus fucosus*

72. Microtus montanus micropus
Montane Meadow Mouse

73. Microtus longicaudus latus
Long-tailed Meadow Mouse

74. Lagurus curtatus curtatus

75. Lagurus curtatus intermedium
Sagebrush Vole

76. Mus musculus
House Mouse

77. Erethizon dorsatum couesi

78. Erethizon dorsatum epixanthum
Porcupine

79. Canis latrans lestes

80. Canis latrans mearnsi
Coyote

81. Canis lupus youngi
Wolf

82. Vulpes fulva necator
Red Fox

83. Vulpus macrotis nevadensis

*The entire range of this species is contained within the TRC.

84. Vulpes macrotis arsipus
Kit Fox

85. Urocyon cinereoargenteus scottii
Gray Fox

86. Bassariscus astutus nevadensis
Ring-tailed Cat

87. Procyon lotor pallidus
Raccoon

88. Mustela frenata nevadensis
Long-tailed Weasel

89. Taxidea taxus berlandieri

90. Taxidea taxus taxus
Badger

91. Spilogale gracilis gracilis

92. Spilogale gracilis saxatilis
Spotted Skunk

93. Mephitis mephitis estor

94. Mephitis mephitis major
Striped Skunk

95. Felis concolor californica
Cougar

96. Felis concolor kaibabensis
Cougar

97. Lynx rufus baileyi

98. Lynx rufus pallescens
Bobcat

99. Dama hemionus hemionus
Mule Deer

100. Antilocarpa americana americana
American Pronghorn

101. Ovis canadensis nelsoni

102. Ovis canadensis canadensis
Desert Bighorn Sheep

103. Cervus canadensis
Wapiti (Elk)

104. Cows

105. Horses

106. Burros

107. Domestic Sheep

1. Gopherus agassixi
Desert Tortoise

2. Coleonyx variegatus utahensis

3. Coleonyx variegatus variegatus
Western Banded Gecko

4. Callisaurus draconoides gabbi

5. Callisaurus draconoides myurus
Zebra-tailed Lizard

6. Crotophytus collaris baileyi
Collared Lizard

7. Crotophytus wislizeni wislizeni
Leopard Lizard

8. Dipsosaurus dorsalis
Desert Crested Lizard

9. Phrynosoma platyrhinos platyrhinos

10. Phrynosoma platyrhinos calidiarum
Desert Horned Lizard

11. Sauromalus obesus obesus
Chuckwalla

12. Sceloporus graciosus graciosus
Sagebrush Lizard

13. Sceloporus magister
Desert Spiny Lizard

14. Sceloporus occidentalis biseriatus
Western Fence Lizard

15. Uta stansburiana stejnegeri
Side-blotched Lizard

16. Xantusia vigilis
Yucca Night Lizard

17. Eumeces skiltonianus
Western Skink

18. Eumeces gilberti rubricaudatus
Gilbert's Skink

19. Cnemidophorus tigris tigris
Whip-Tailed Lizard

20. Leptotyphlops humilis humilis
Western Worm Snake

21. Leptolyphlops humilis utahensis
Western Worm Snake

22. Arizona elegans eburnata
Glossy Snake

23. Chionactis occipitalis occipitalis

24. Chionactis occipitalis talpina
Western Shovel-nosed Snake

25. Coluber constrictor mormon
Blue Racer

26. Diadophis regalis
Ring-Necked Snake

27. Hypsiglena torquata deserticola
Spotted Night Snake

28. Lampropeltis getulus californiae
Common King Snake

29. Masticophis flagellum piceus
Common Whipsnake

30. Masticophis taeniatus
Desert Striped Whipsnake

31. Phyllorhynchus decurtatus perkinsi
Spotted Leaf-nised Snake

32. Pituophis catenifer deserticola
Gopher Snake

33. Rhinocheilus lecontei lecontei
Long-nosed Snake

34. Sonora semiannulata isozona
Western Ground Snake

35. Salvadora hexalepis mojavensis
Western Patch-nosed Snake

36. Thamnophis elegans vagrans
Western Garter Snake

37. Crotalus cerastes cerastes
Sidewinder

38. Croialus viridis lutosus
Western Rattlesnake

39. Crotalus scutulatus
Mahave Rattlesnake

40. Crotalus mitchelli
Speckled Rattlesnake

1. Scophiopus hammondi intermontanus
Western Spade-foot Toad

2. Bufo boreas boreas

3. Bufo boreas bombifrons
Western Toad

4. Bufo cognatus
   Great Plains Toad

5. Bufo woodhousei
   Woodhouse Toad

6. Bufo microscophus microscophus
   Southwestern Toad

7. Bufo punctatus
   Desert Toad

8. Hyla regilla
   Pacific Tree Frog

9. Rana catesbeiana
   Bullfrog

10. Rana pipiens
    Leopard Frog

1. Gavia immer
   Common Loon

2. Podiceps caspicus
   Eared Grebe

3. Podiceps auritus*
   Horned Grebe

4. Aechmophorus occidentalis*
   Western Grebe

5. Podilymbus podiceps
   Pied-billed Grebe

6. Pelacanus erythrorhynchos
   White Pelican

7. Phalacrocorax auritus albociliatus
   Double-creasted Cormorant

8. Aredea herodias treganzai*
   Blue Heron

9. Casmerodius albus egretta
   White Egret

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*This species nests within the TRC.

10. Egretta thula brewsteri
    Snowy Egret

11. Butorides virescens anthonyi
    Green Haron

12. Nycticorax nycticorax hoactli
    Black-crowned Night Heron

13. Botaurus lentiginosus
    American Bittern

14. Ixobrychus exilis hesperis
    Least Bittern

15. Mycteria americana
    Wood Ibis

16. Plegadis chihi
    White-faced Ibis

17. Olor columbianus
    Whistling Swan

18. Olor buccinator*

    Trumpeter Swan

19. Branta canadensis moffitti*

20. Branta canadensis minima
    Canada Goose

21. Chen caerulescens hyperborea
    Snow Goose

22. Dendrocygna bicolor helva
    Fulvous Tree Duck

23. Anas platyrhynchos*
    Mallard

24. Anas acuta
    Pintail

25. Anas strepera*
    Gadwall

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*This species nests within the TRC.

26. Anas carolinensis
Green-winged Teal

27. Anas discors
Blue-winged Teal

28. Anas cyanoptera
Cinnamon Teal

29. Spatula clypeata
Shoveler

30. Mareca americana
American Wigeon

31. Aythya americana
Redhead

32. Aythya collaris
Ring-necked Duck

33. Aythya valisineria
Canvasback

34. Aythya affinis
Lesser Scaup

35. Bucephala clangula
American Goldeneye

36. Bucephala albeola
Bufflehead

37. Melanitta deglandi
White-winged Scoter

38. Melanitta perspicillata
Surf Scoter

39. Oxyura jamaicensis*
Ruddy Duck

40. Mergus serrator
Red-breasted Merganser

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*This species nests within the TRC.

41. Cathartes arua teter*
    Turkey Vulture

42. Accipiter gentilis*
    Goshawk

43. Accipiter striatus velox*
    Sharp-shinned Hawk

44. Accipiter cooperii*
    Cooper's Hawk

45. Buteo borealis calurus*
    Red-tailed Hawk

46. Buteo swainsoni
    Swainson's Hawk

47. Buteo lagopus
    Rough-legged Hawk

48. Buteo regalis*
    Furruginous Hawk

49. Aauilla chrysaetos candadensis*
    Golden Eagle

50. Haliaeetus leucocephalus
    Bald Eagle

51. Circuis cyaneus hudsonius*
    Marsh Hawk

52. Pandion haliaetus
    Osprey

53. Falco mexicanus*
    Prairie Falcon

54. Falco peregrinus anatum* **
    Peregrine Falcon

55. Falco columbarius bendirei
    Merlin

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*This species nests within the TRC.
**Endangered species, 16 USC 668 aa, Appendix D.

56. Dendragapus obscurus obscurus*
Blue Grouse

57. Centrocercus urophasianus*
Sage Grouse

58. Lophortyx gambelii gambelii*
Gambel's Quail

59. Alextoris graeca*
Chukar

60. Falco aparverius*
American Kestrel

61. Meleagris gallopavo*
Turkey

62. Grus canadensis tabida
Sandhill Crane

63. Rallus limicola limicola
Virginia Rail

64. Porzana carolina
Soar

65. Coturnicops noveboracensis
Yellow Rail

66. Gallinula chloropus
Common Gallinule

67. Porphyrula martinica
Purple Gallinule

68. Fulica americana*
Coot

69. Charadrius alexandrinus nivosus
Snowy Plover

70. Charadrius semipalmatus
Semipalmated Plover

*This species nests within the TRC.

71. Charadrius vociferus*
Killdeer

72. Eupoda montana
Mountain Plover

73. Pluvialis dominica dominica
Golden Plover

74. Pluvialis squatarola
Black-bellied Plover

75. Arenaria interpres
Ruddy Turnstone

76. Capella gallinago delicata*
Common Snipe

77. Numenius americanus
Long-billed Curlew

78. Actitis macularis
Spotted Sandpiper

79. Tringa solitaria cinnamomea
Solitary Sandpiper

80. Catoptrophorus semipalmatus
Willet

81. Tringa melanoleucus
Greater Yellowlegs

82. Tringa flavipes
Lesser Yellowlegs

83. Calidris melanotos
Pectoral Sandpiper

84. Calidris bairdii
Baird's Sandpiper

85. Calidris minutilla
Least Sandpiper

*This species nests within the TRC.

86. Calidris alpina pacifica
Dunline

87. Limnodromus scolopaceus
Long-billed Dowitcher

88. Calidris mauri
Western Sandpiper

89. Micropalma himantopus
Stilt Sandpiper

90. Limosa fedoa
Marbled Godwit

91. Crocethia alba
Sanderling

92. Himantopus mexicanus
Black-necked Stilt

93. Recurvirostra americana
Avocet

94. Steganopus tricolor
Wilson's Phalarope

95. Lobipes labatus
Northern Phalarope

96. Larus californicus
California Gull

97. Larus delawarensis
Ring-billed Gull

98. Larus philadelphia
Bonaparte's Gull

99. Sterna forsteri
Forester's Tern

100. Childonias nigra
Black Tern

101. Zenaidura macroura marginella
Mourning Dove

102. Zenaidura asiatica
White-winged Dove

103. Columba fasciata
Band-tailed Pigeon

104. Columbigallina passerina
Ground Dive

105. Geococcyx califorianus
Roadrunner

106. Tyto alba pratincola
Barn Owl

107. Otis asio cineraceus*
Screech Owl

108. Otis flammeolus*
Flamulated Owl

109. Bubo virginianus occidentalis*
Great-horned Owl

110. Bubo virginianus pallescens*
Great-horned Owl

111. Nyctea nuctea
Snowy Owl

112. Speotyto cunicularia hypugaea*
Burrowing Owl

113. Asio otis*
Long-eared Owl

114. Asio flameus
Short-eared Owl

115. Aegolius acadicus
Saw-whet Owl

116. Phalaenoptilus nuttallii nuttallii
Poor-will

117. Chordeiles minor hesperis
Common Nighthawk

This species nests within the TRC.

118. Chordeiles acutipennis texensis
Lesser Nighthawk

119. Caprimulgus vociferus arazonae
Whip-poor-will

120. Chaetura vauxi
Vaux's Swift

121. Aeronautis saxatalis saxatalis
White-throated swift

122. Calypte costae
Costa's Hummingbird

123. Selasphorus platycercus
Broad-tailed Hummingbird

124. Selasphor rufus
Rufous Hummingbird

125. Stellula calliope
Calliope Hummingbird

126. Megaceryle alcyon caurina*
Belted Kingfisher

127. Colaptes auratus collaris*
Yellow-Shafter Flicker

128. Melanerpes formicivorus
Acorn Woodpecker

129. Asyndesmus lewis
Lewis' Woodpecker

130. Sphyrapicus varia nuchalis*
Yellow-bellied Sapsucker

131. Sphyrapicus thyroideus nataliae*
Williamson's Sapsucker

132. Dendrocopos villosus leucothorectis*
Hairy Woodpecker

133. Dendrocopos pubescens leucurus*
Downy Woodpecker

*This species nests within the TRC.

134. Dendrocopos scalaris cactophilus*
Ladder-backed Woodpecker

135. Tyrannus verticalis
Western Kingbird

136. Tyrannus vociferans
Cassin's Kingbird

137. Myiarchus cinerascens cinerascens
Ash-throated Flycatcher

138. Sayornis nigricans semiatra
Black Phoebe

139. Sayornis saya saga
Say's Phoebe

140. Empidonax brewsteri
Traill's Flycatcher

141. Empidonax hammondii
Hammond's Flycatcher

142. Empidonax overholseri
Dusky Flycatcher

143. Empidonax Wrightii
Gray Flycatcher

144. Empidonax difficiiis difficilis
Western Flycatcher

145. Empidonax difficilis hellmaye
Western Flycatcher

146. Contepus sordidulus veliei
Western Wood Pewee

147. Nuttallornis berealis
Oliv-sided Flycatcher

148. Pyrocephalus rubinus flammeus
Vermillion Flycatcher

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*This species nests within the TRC.

149. Eremophila alpestris utahensis*
Horned Lark

150. Eremophila alpestris leucolaema*
Horned Lark

151. Eremophila alpestris ammophila
Horned Lark

152. Tachycineta thalassina lepida
Violet-green Swallow

153. Iridoprocne biocolor
Tree Swallow

154. Riperia riperia
Bank Swallow

155. Stelgidopteryx ruficollis serripennis
Rough-winged Swallow

156. Hirundo rustica erythrogaster
Barn Swallow

157. Petrochelidon pyrrhonota
Cliff Swallow

158. Cyanocitta stelleri macrolopha*
Steller's Jay

159. Aphelocoma coerulescens nevadae*
Scrub Jay

160. Pica pica hudsonia*
Black-billed Magpie

161. Corvus corax sinuatus*
Raven

162. Corvus brachyrhynchos hesperis*
Common Crow

163. Gymnorphinus cyanocephala*
Pinyon Jay

164. Nucifraga columbiana*
Clark's Nutcracker

*This species nests within the TRC.

165. Parus gambeli inyoensis*
Mountain Chickadee

166. Parus inornatus ridywayi*
Plain Titmouse

167. Auriparus flaviceps*
Verdin

168. Psaltriparus minimus plumbeus*
Bush Tit

169. Sitta carolinensis tenuissima*
White-breasted Nuthatch

170. Sitta canadensis*
Red-breasted Nuthatch

171. Sitta pygmaea melanotis*
Pygmy Nuthatch

172. Certhia familiaris leucostieta*
Brown Creeper

173. Cinclus mexicanus*
Dipper

174. Troglodytes aldon parkmanii*
House Wren

175. Thryomanes bewickii eremophilus*
Bewick's Wren

176. Camphlorhynchus brunneicapillus*
Cactus Wren

177. Telmatodytes palustris aestuarinus*
Long-billed Marsh Wren

178. Catherpes mexicanus*
Canyon Wren

179. Salpinetes obsoletus*
Rock Wren

180. Mimus polyglottos leucopterus
Mockingbird

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*This species nests within the TRC.

181. Dumetellu carolinensis
Catbird

182. Toxostoma lecontei lecontei
Lecont's Trasher

183. Toxostoma dorsale dorsale
Crissal Trasher

184. Oreoscoptes montanus
Sage Trasher

185. Turdus migratorius propinquus*
Robin

186. Ixoreus maevius meruloides
Varied Thrush

187. Catharus guttata polionota
Her¬it Thrush

188. Catharus guttata oromela
Mermit Thrush

189. Catharus ustulata ustulata
Swainson's Thrush

190. Catharus ustulata almae
Swainson's Thrush

191. Sialia mexicana bairdi
Western Bluebird

192. Sialia currucoides
Mountain Bluebird

193. Myadestes townsendi townsendi
Townsend's Solitaire

194. Poliopeila caerulea amoenissima
Blue-gray Gnatcatcher

195. Regulus satrapa
Golden-crowned Kinglet

*This species nests within the TRC.

196. Regulus calendula cineaceus
Ruby-crowned Kinglet

197. Anthus spinoietta rubescens
Water Pipit

198. Bombycilla cedrorum
Cedar Waxwing

199. Phainopela nitens lepide
Phainopepla

200. Lanius ludovicianus gambeli
Loggerhead Shrike

201. Sturnus vulgaris
Starling

202. Vireo vicinior
Gray Vireo

203. Vireo solitarius plumbeus
Solitary Vireo

204. Vireo flavifrons
Yellow-throated Vireo

205. Vireo gilvus swainsonii
Warbling Vireo

206. Vermivora celata orestera
Orange-crowned Warbler

207. Vermivora celata celata
Orange-crowned Warbler

208. Vermivora ruficapilla
Nashville Warbler

209. Vermivora virginiae
Virginia Warbler

210. Vermivora luciae
Lucy's Warbler

211. Helmitheros vermivorus
Worm-eating Warbler

212. Parula americana
Parula Warbler

213. Dendroica petechia
Yellow Warbler

214. Dendroica coronata coronata
Myrtle Warbler

215. Dendroica coronata memorabilis
Myrtle Warbler

216. Dendroica coronata auduboni
Myrtle Warbler

217. Dendroica nigrescens
Black-throated Gray Warbler

218. Dendroica graciae graciae
Grace's Warbler

219. Dendroica townsendi
Townsend's Warbler

220. Oporornis tolmiei monticola
Macgillivary's Warbler

221. Geothlypis trichas scirpicola
Yellowthroat

222. Geothlypis trichas occidentalis
Yellowthroat

223. Gelthlypis trichas campicola
Yellowthroat

224. Icteria virens
Yellow-breasted Chat

225. Wilsonia pusilla pileolata
Wilson's Warbler

226. Wilsonia pusilla chryseola
Wilson's Warbler

227. Steophaga picta picta
Redstart

228. Passer domesticus*
House Sparrow

229. Sturnella neglecta neglecta*
Meadowlark

230. Xanthocephalus xanthocephalus*
Yellow-headed Blackbird

231. Agelaius phoeniceus*
Red-winged Blackbird

232. Icterus parisorum
Scott's Oriole

233. Icterus galbula bullockii
Bullock's Oriole

234. Euphagus cyanocephalus*
Brewer's Blackbird

235. Quiscalus quiscala
Common Grackle

236. Molothrus ater obscurus
Brown-headed cowbird

237. Molothrus ater artemisiae
Brown-headed cowbird

238. Dolichonyx oryzivorus
Bobolink

239. Piranga ludoviciana
Western Tanager

240. Piranga flava hepatica
Hepatic Tanager

241. Pheucticus melanocephalus
Black-headed Grosbeak

242. Guiraca caerulea interfusa
Blue Grosbeak

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*This species nests within the TRC.

243. Passerina amoena
Laxuli Bunting

244. Hesperiphona vespertina brooksi
Evening Grosbeak

245. Carpodacus purpureus californicus
Purple Finch

246. Carpodacus cassinii*
Cassin's Finch

247. Carpodacus mexicanus frontalis*
House Finch

248. Spinus pinus pinus
Pine Siskin

249. Spinus tristis pallidus
Common Goldfinch

250. Spinus psaltria hesperophilus
Lesser Goldfinch

251. Loxia curvirostra bendirei
Red Crossbill

252. Chlorura chlorura
Green-tailed Towhee

253. Pipilo erythropthalmus montanus
Rufous-sided Towhee

254. Calamospiza melanocorys
Lark Bunting

255. Passerculus sandwichensis nevadensis*
Savannah Sparrow

256. Pooecetes gramineus confinis
Vesper Sparrow

257. Chondestes grammacus strigatus
Lark Sparrow

258. Amphispiza bilineata deserticola
Black-throated Sparrow

*This species nests within the TRC.

259. Amphispiza belli nevadensis*
Sage Sparrow

260. Junco hyemalis cismontanus
Slate-colored Junco

261. Junco hyemalis montanus
Slate-colored Junco

262. Junco hyemalis mearnsi
Slate-colored Junco

263. Junco caniceps caniceps
Gray-headed Junco

264. Spizella passerina arizonae
Chipping Sparrow

265. Spizella breweri
Brewer's Sparrow

266. Spizella atrogularis evura
Black-chinned Sparrow

267. Zonotrichia leucophrys gambeli
White-crowned Sparrow

268. Zonotrichia leucophrys oriantha
White-crowned Sparrow

269. Zonotrichia atricapilla
Golden-crowned Sparrow

270. Passerella iliaca schistacea
Fox Sparrow

271. Melospiza lincolnii
Lincoln Sparrow

272. Melospiza melodia fallax
Song Sparrow

273. Melospiza melodia montana*
Song Sparrow

274. Calcarius lapponicus lapponicus
Lapland Longspur

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*This species nests within the TRC.

1. Salvelinus fontinalis
   Brook Trout

2. Salmo clarki henshawi**
   Lahontan Cutthroat Trout

3. Salmo trutta
   Brown Trout

4. Pantosteus lahontan
   Lahontan Mountain Sucker

5. Pantosteus intermedius
   White River Mountain Sucker

6. Catostomus ardens
   Utah Sucker

7. Gila robusta jordani* **
   White River Gila

8. Richardsonius egregius
   Lahontan Redshiner

9. Siphateles bicolor obesus
   Lahontan Tui Chub

10. Rhinichthys osculus robustus
    Lahontan Speckled Dace

11. Rhinichthys osculus nevadensis
    Amargosa Speckled Dace

12. Rhinichthys osculas velifer
    White River Speckled Dace

13. Moapa coriacea* **
    Moapa Dace

14. Cyprinus carpio
    Asian Carp

15. Lepidomeda mollispinus pratensis
    Big Spring Spinedace

*The entire range of this species is contained within the TRC.
**Endangered species, 16 USC 668 aa, Appendix D.

16. Lepidomeda altivelis
    Pahranagat Spinedace

17. Lepidomeda albivallis*
    White River Spinedace

18. Ictalurus catus
    White Catfish

19. Ictalurus melas
    Black Bullhead

20. Crenichthys baileyi
    White River Springfish

21. Crenichthys nevadae*
    Railroad Valley Springfish

22. Gambusia affinis
    Mosquitofish

23. Perca flavescens
    Yellow Perch

24. Micropterus dolomieui
    Smallmouth Blackbass

25. Micropterus salmiodes
    Largemouth Blackbass

26. Lepomis macrochirus
    Bluegill Sunfish

*The entire range of this species is contained within the TRC.

1.	Abies concolor	White fir
2.	Agropyron spicatum	Bluebunch wheatgrass
3.	Agropyron inerme	Bluebunch wheatgrass
4.	Amelanchier pallida	Serviceberry
5.	Ambrosia dumosa	Bursage
6.	Arctostophylos nevadensis	Pinemat manzanita
7.	Artemisia nova	Black sagebrush
8.	Artemisia spinescens	Bud sagebrush
9.	Artemisia tridentata	Big sagebrush
10.	Artemisia spp.	Sagebrush
11.	Atriplex conescens	Four-wing saltbrush
12.	Atriplex confertifolia	Shadscale
13.	Bromus tectorum	Cheatgrass
14.	Ceanothus velutinus	Buckbrush
15.	Cercocarpus ledifolius	Mountain mahoghony
16.	Chrysothamnus novseosus	Rubber rabbitbrush
17.	Chrysothamnus viscidiflorus	Green rabbitbrush
18.	Coleogyne ramossisima	Blackbrush
19.	Cowania neomexicana	Cliffrose
20.	Distichiles stricta	Saltgrass
21.	Elymus cinereus	Great Basin wildrye
22.	Eurotia lanata	Whitesage
23.	Grayia spinosa	Spiny hopsage
24.	Hilaria jamesii	Galleta
25.	Hilaria rigida	Big galleta
26.	Juniperus osteosperma	Utah juniper
27.	Larrea tridentata	Creosate bush
28.	Lycium andersoni	Box thorn
29.	Opuntia spp.	Prickly pear cactus
30.	Oryzopsis hymenoides	Indian ricegrass
31.	Picea engelmanii	Engelman spruce
32.	Pinus albicaulis	Whitebark pine
33.	Pinus flexilis	Limber pine
34.	Pinus longaeva	Bristlecone pine
35.	Pinus monophylla	Single needle pinyon
36.	Pinus ponderosa	Yellow pine
37.	Poa nevadensis	Nevada bluegrass
38.	Poa secunda	Sandberg's bluegrass
39.	Populus tremuloides	Quaking aspen
40.	Purshia glandulosa	Desert bitterbrush

41.	Purshia tridentata	Antelope butterbrush
42.	Quercus gambellii	Gambel's oak
43.	Quercus turbinella	Scrub oak
44.	Salsola kali	Russian thistle
45.	Sarcobatus baileyi	Bailey's greasewood
46.	Sarcobatus vermiculatus	Greasewood
47.	Sitanian hystrix	Squirrel tail
48.	Stipa comata	Needle-and-threat grass
49.	Stipa speciosa	Desert needlegrass
50.	Symphoricarpus spp.	Snowberry
51.	Yucca boccata	Spanish bayonet
52.	Yucca brevifolia	Joshua tree
53.	Yucca schidigera	Mojave yucca

APPENDIX B

ECOSYSTEM MODELING FOR ENVIRONMENTAL IMPACT ASSESSMENT

This appendix is designed to provide the non-ecologist with the perspective needed to evaluate possible impacts. Basically, it is a brief exposure of the processes essential for an ecological understanding of how impacts may be incorporated into an ecosystem.

Natural systems have taken millions of years to evolve to their present state, and if violated may change significantly from the existing state to one quite different. Such a change is necessary for the system to persist, but it certainly will be accompanied by some species adjustment, and in many cases, species departures altogether. If the latter species have limited ranges, their extinction is inevitable; more dispersed species may simply reduce their ranges or alter their niches. In all, the thousands of adjustments required to prevent system sterility are dynamic and must be considered as such.

Numerous questions require reasonable answers before all these adjustments can be predicted, and that is basically the responsibility of an Environmental State (ES). Obviously, neither the technology nor the information is developed enough to provide the complete set of accurate answers. Many of the questions cannot even be asked

adequately, although many of the most important seem obvious. It is the latter that must be addressed first; in their solution, others may prove insignificant. Unfortunately, before the questions can be partitioned appropriately, some type of functional model is required.

Since the ES is directly concerned with the existing natural systems (ecosystems), it falls well within the concern of ecological processes; and it must rely on the analytical tools developed by ecologists and their contributing companion disciplines: physiology, evolution, behavior, and genetics (Figure B.1). Furthermore, Figure B.1 demonstrates the need to review findings in areas other than strictly ecology, since they may contribute considerably to the solution of many ecological or environmental questions.

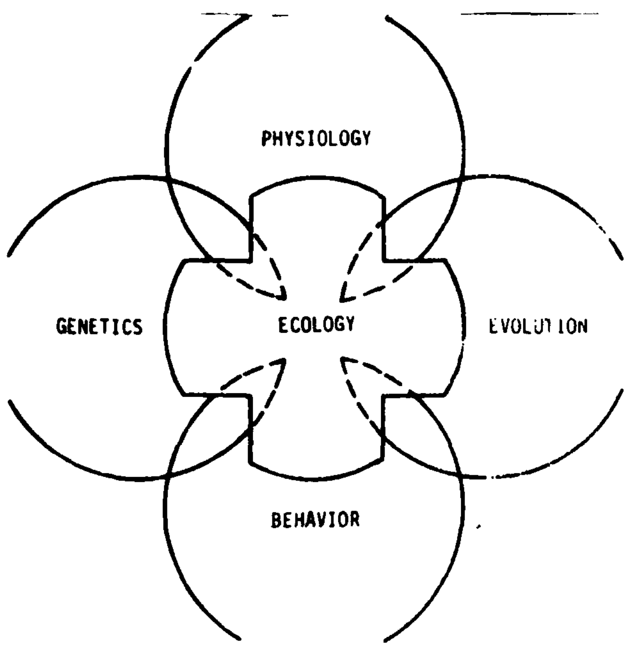


Figure B.1. Interrelations of the Essential Disciplines in an Environmental Statement (ES)

Projected Impact Evaluation:

The basic ecological unit is now generally accepted as being the ecosystem, since it relates the physical and functional concepts together for total systems maintenance. A terrestrial ecosystem has basically four living components: (1) Producers - including the green plants, (2) Primary Consumers - including the herbivores, (3) Secondary Consumers - including the carnivores, and (4) Decomposers - including the bacteria. Two fundamental processes relate these components: (1) elemental cycling and (2) energy transfer. The differential rates of both processes are functions of intrinsic and environmental factors influencing the relationships of the physical components. Figure B.2 is a simplified flow diagram of the relationships of the physical components.

Relationships of the components are apparent in Figure B.2, although it provides no information on the type of relationships. Energy transfer from one component to the next is essentially in the form of consumption (predation, parasitism, grazing, decomposing, etc.). Energy enters as light or as organic import, and leaves as heat (via respiration) or as organic export. Elements essential to species growth are primarily recycled internally, although some may be imported and exported.

The definition of an ecosystem is arbitrary; it usually represents a unit that can be conveniently studied. An ecosystem may be

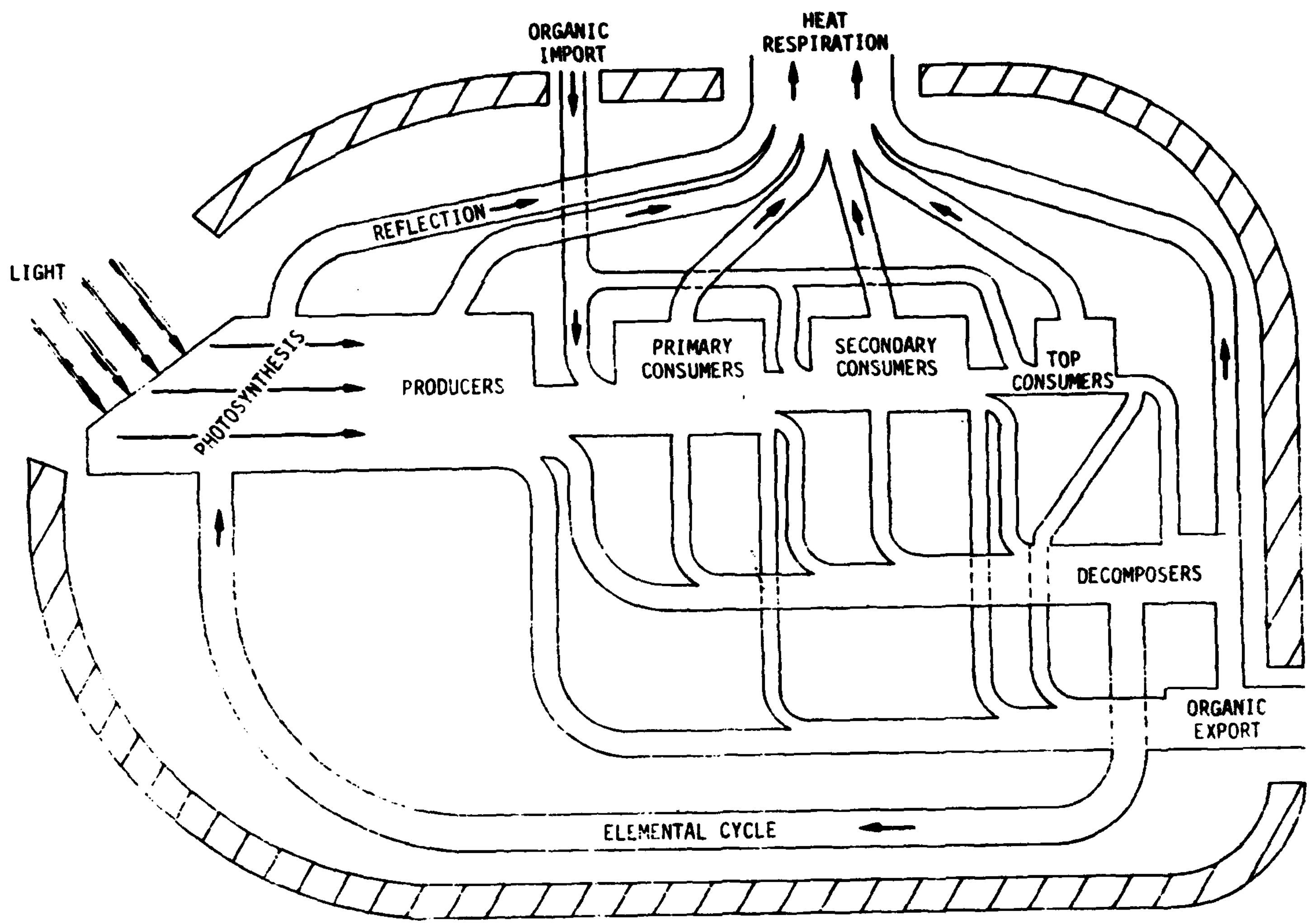


Figure B.2. Interrelationships of Components Within a Terrestrial Ecosystem

as small as an aquarium or terrarium. Since organic production is restricted to ecosystems, the organic imports and exports are the ties that link the arbitrarily defined ecosystems together. Perhaps the clearest vision would be completely connected systems of interlocking rings (ecosystems) of various sizes, with all systems to a greater or lesser degree interdependent. Thus, induced adjustments will not go unnoticed in others. The magnitude of such adjustments has reached incomprehensible levels with man's mobility and transfer capability. In some cases, several entire components have been removed and transferred to totally different systems, such as found in the expanded agricultural business. However dependent the systems are on each other, the primary impact is felt within a system.

Processes within an ecosystem, which demonstrate the required adjustments when alterations are made by man, are best seen by examining a simple food web. In this case, the food web is theoretical, since none have been developed specifically for desert environments, although the U. S. International Biological Program (USIBP) Desert Biome studies are attempting to model North American deserts altogether. Possibly the best example would include the organisms most likely to be present and interacting on the North Range.

The North Range is located primarily in Salt Desert Shrub community, where the principle species are:

Producers	Black sagebrush	Indian rice grass
	Bud sage	Russian thistle
	Four-winged saltbrush	Shadscale
	Globe mallow	Spiny hopsage
	Greasewood	Winterfat
Primary Consumers	Brewer's sparrow	Ord kangaroo rat
	Chisel-tooth kangaroo rat	Pallid kangaroo mouse
	Horned lark	Sage thrasher
	least pocket mouse	Vesper sparrow
	Mourning dove	White-footed mouse
Secondary Consumers	Horned lizard	Raven
	Kit fox	Red-tailed hawk
	Loggerhead shrike	Side-blotched lizard
	Marsh hawk	Whip-tailed lizard
	Rattlesnake	
Top Consumers	Badger	Coyote
	Bobcat	Golden eagle

A diagramatic model of these many species (and these are only a partial list) would be very difficult to prepare and almost impossible to interpret visually. Consequently, only a few of the species will be included (Figure B.3). Obviously, the web illustrated in Figure B.3 is limited even more than it first appears, since its only driving force is the transfer of energy. Decomposition is not included.

Some liberties can be taken while interpreting the generalized behavior and importance of such a model. Suppose, for instance, that air traffic were to increase to the extent that marsh hawks simply left the area for others where reproduction and feeding suffered less

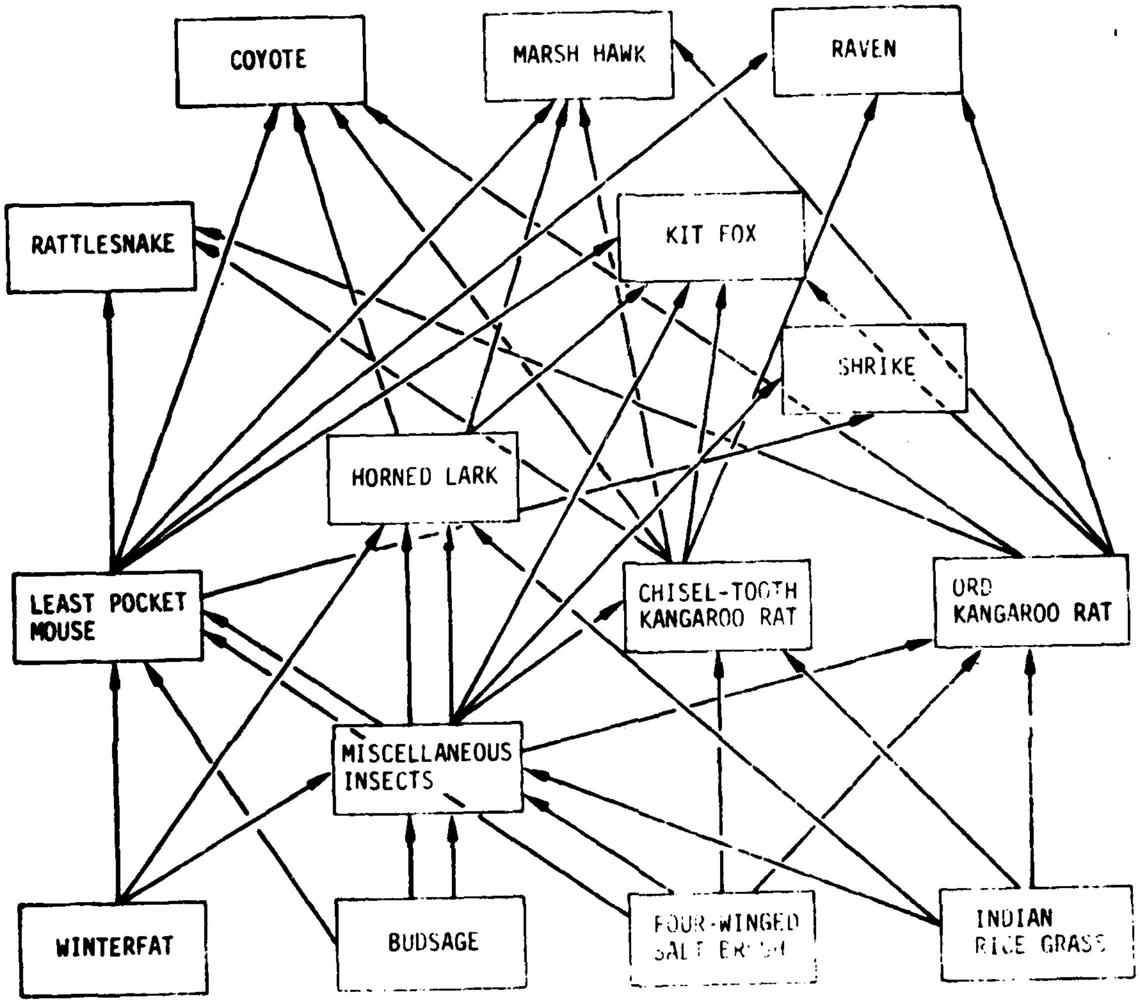


Figure B.3. Theoretical Food Web for the North Range

intrusion. Although not necessarily so, this could result in an increase in other secondary consumers which in turn, might reduce the primary consumers. Major shifts in the primary consumers could have significant effect on the composition of producers. Not only would the impact be felt by the North Range biota, but the areas into which the marsh hawks moved would be impacted in a somewhat reverse manner. Obviously, this hypothetical case is much too simplified to be predictable, but it demonstrates the interactions of impact and the concern of ecologists or multiple users of a range. It is possible that activity in the airspace could have an impact that will eventually change even the vegetation -- without the ground itself even being touched.

The preceding discussion should make it clear that any Environmental Statements must include at least a projected scheme of how an impact may be felt by the environment. Also, it is apparent that such an ES must include an ecosystem analysis to describe the existing ecosystem as the basis for projected impacts. Perhaps a more specific and certainly appropriate evaluation can be made if the interactions of known species are at least projected.

Before a species can survive in an ecosystem, it must evolve an effective means of reproducing. Reproduction is often one of the most specialized activities an organism engages in, and probably the most vulnerable to perturbation because it is so specialized and because it is uncompromising in terms of species survival. Possible impacts

on reproduction are best examined in view of the reproductive process itself. This is modeled generally in Figures B.4 and B.5, which illustrate the essential demographic steps leading to successful reproduction. The generalized model (Figure B.4) requires some additional detailing (Figure B.5) as far as N_6 and N_8 are concerned, because these are the stages that assume the responsibility of reproduction, and induced interferences are likely to occur within them. Also, birth rates are essentially a function of what occurs during these stages. In Figures B.4 and B.5, the Ns represent the numbers of organisms in various states (e.g. fetus, offspring, mature male, immature male, etc.) at a given time, t. The Ps represent the losses to the population from different modes of predation; the Ds represent losses to the population by various natural causes; and the Rs and Bs represent additions to the population by reproduction. The necessary level of detail in subdividing each of these functions is a model requirement driven by the complexity of the system being modeled.

The model is deliberately designed to be as general as possible so that species with highly different life cycles can be modeled within the generalized scheme with convenient modifications. The rates of change (P, D, R) are obviously the most important factors to estimate, as far as environmental impact is concerned, since they are more sensitive than the status components (N). Since the time interval (as designated for the species concerned) between t and t + 1 may be any length in difference equations, the generalized difference equations for all rates may be written as:

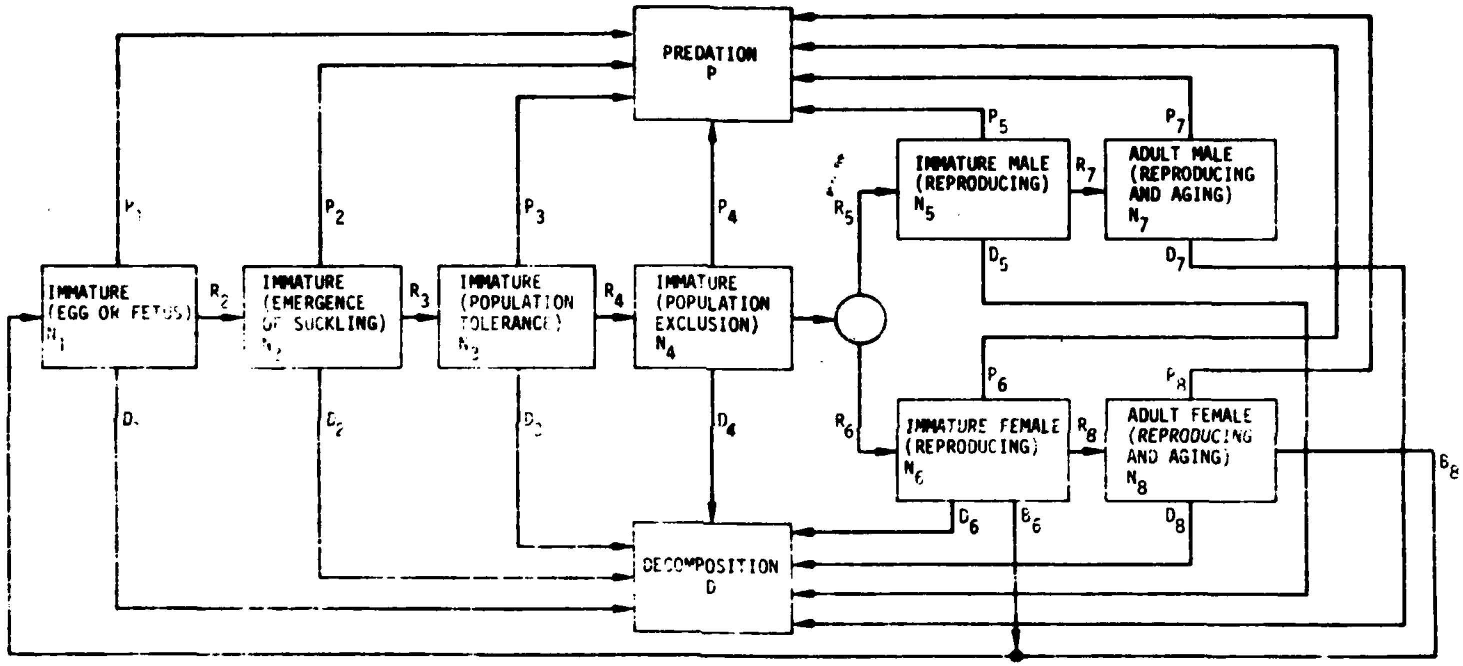


Figure B.4. Flow Diagram for Reproduction in a Natural Demographic Model

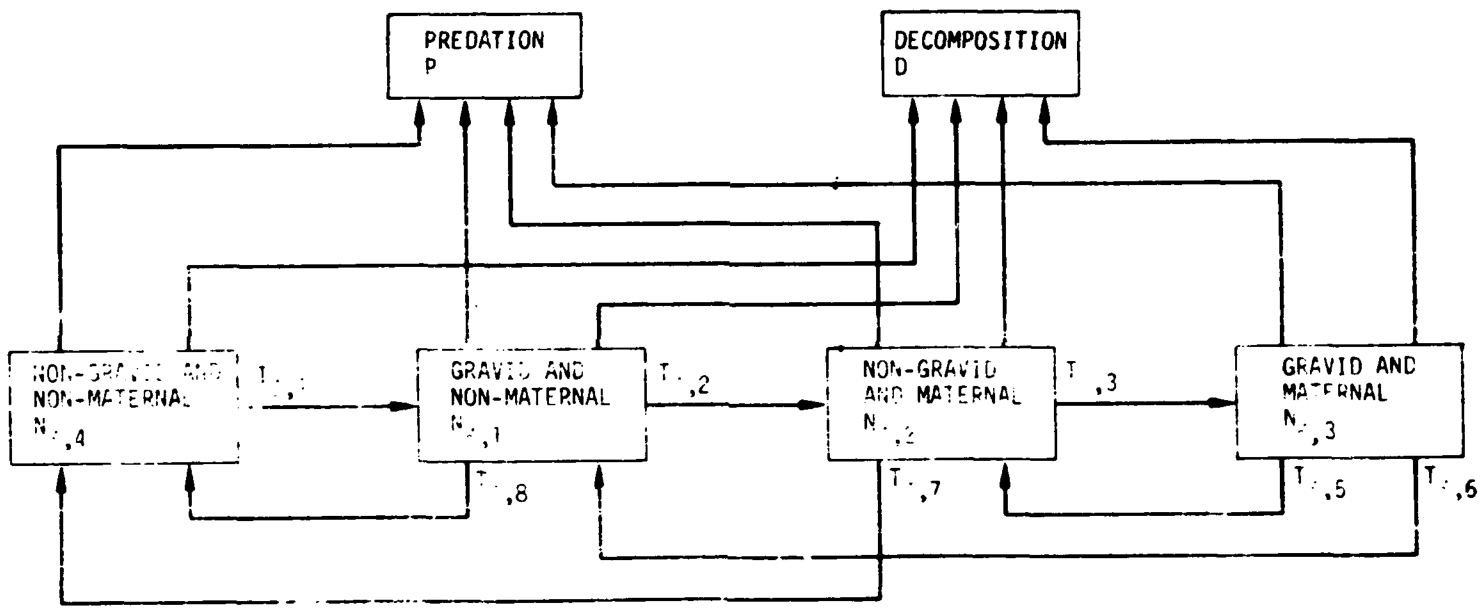


Figure B.5. Flow Diagram for Reproduction Among Females Capable of Reproducing (Block N_6 or N_8)

State variable at the next time (t + 1) = State variable at the present time (t) + Change in state variable between t and t + 1

This is expressed mathematically as:

$$N_i\ (t + 1) = N_i\ (t) + C_i\ (t)$$

where $N_i\ (t + 1)$ = Number of organisms in category i at time t + 1

$N_i\ (t)$ = Number of organisms in category i at time t

$C_i\ (t)$ = Change in number of organisms in category i when moving from time t to t + 1. This change can be negative, zero or positive, depending on whether the $\underline{i}^{th}$ category is decreasing, unchanging or increasing, respectively.

When specific functional difference equations are generated for different species' parameters, time intervals must be designated. Since this model is obviously only a portion of a total ecosystem model, such time intervals must be long enough to include the discrete nature of certain population processes and yet short enough to approximate the continuous nature of rapidly progressing phenomena. Each species will require its own time intervals.

APPENDIX C

EVALUATION OF THE POPULATION DYNAMICS OF DESERT BIGHORN SHEEP

In most cases, species occupy a niche such that their respective populations would be expected to survive as long as the environment does not shift significantly from its mean. There can be a high degree of variation; but when the mean shifts, all species will have to make an adjustment -- some may enlarge their niche and increase numbers, while others decrease in fertility rates, can have cascading effects on the population. In summary, most species (particularly those in desert environments) live in an environment imposing rather restrictive ranges on their population parameters. Consequently, small changes in these environments can have dramatic effects on the populations; and most species have evolved very narrow tolerance limits. Desert Bighorn Sheep are examples of these animals and will be illustrated here.

Now that the reproductive model has been developed (Appendix B), one must determine which component(s) to survey periodically to monitor the impact on a chosen species (Desert Bighorn Sheep in this example). Here is is assumed that sutdies of reproduction are likely to be most illuminating. Also it would be most convenient to require the measurement of only one of the model components; and this might be sufficient in some cases.

The total reproduction of a species is assessed by coordinating the birth and death rates among the states N_1 to N_8, producing what is generally referred to as a "life table." Life tables, when extended to include fertility tables, can conveniently be used to evaluate the "net reproductive rate" (R_o).

These tables are exemplified with Desert Bighorn Sheep data. Some of the data required were not available; thus, some extrapolations or even inferences were made to complete the calculations in Table C.1. The terms in these combined tables may be defined as:

x = age interval, years

$d(x)$ = number of dying during the age interval x to x + 1

$l(x)$ = number of survivors at the start of age interval x

$q(x)$ = rate of mortality during the age interval x to x + 1

$e(x)$ = mean expectation of life for organisms alive at the start of age x

$l'(x)$ = probability of female survival to the pivotal age - $[x + (x+1)]/2$

$m(x)$ = number of female offspring per female age x, per time unit (one year in this table)

R_o = net reproductive rate

The net reproductive rate (R_o) can be used to generate a logistic growth curve:

$$N(t) = N(0)\, e^{r_m t}$$

where $N(0)$ = number of individuals at time 0

$N(t)$ = number of individuals at time t

$r(m)$ = innate capacity to increase (or decrease) for some specific environmental condition

t = time

The factor r_m can be obtained from R_o by:

$$r_m = \frac{\log_e (R_o)}{G}$$

with G = the mean length of generation, defined by

$$G = \frac{\Sigma \ell'(x)\ m(x)\ X}{R_o}$$

If $R_o = 1$, then $r_m = 0$ (Eq, C.2) and $N(t) = N(0)$ for $t \geq 0$ (Eq. C.1). Thus, an R_o of 1.0 signifies a replacement level of reproduction for which the species population is in steady-state equilibrium. If $R_o > 1$, r_m is positive and the population will grow, doubling in a period equal to $0.693/r_m$. In a similar fashion, $R_o < 1$ leads to a declining population.

The data shown in Table C.1 for age specific fertilities m(x) were synthesized to conform with the limited knowledge concerning Bighorn Sheep reproduction. For example, it is quite well known that the ewes do not bear in the first three years, and that the life expectancy is approximately 15 years. The last few years are expected to be nearly barren. In between, a schedule of age specific fertilities is adopted which shows a gradual build-up and then decline and which can be roughly calibrated against known population data.

With the assumed schedule for m(x), a net reproduction rate of 1.56 is deduced which, if correct, would cause the population to grow. However, it is known that the particular herd from which this data was taken is regulated in number by hunting (only males are taken), and consequently the population had held roughly constant throughout the period. Thus when the effect of regulation through hunting is included in the life tables, an R_o for the total population of 1.0 should result.

It is known that the percentage kill among all ages was about 40 percent of all males that dies, leaving about 60 percent of all deaths attributable to natural causes. If it can be assumed that through this study period the population was in steady-stage equilibrium with a corresponding stable age structure, then it can be shown that the effect of a steady 40 percent kill rate due to hunting will cause the population to have about twice as many females as males and that the net reproduction rate of the unbalanced population, assuming the same schedule of fertilities, will be near 1.0. Even though this is a necessary condition to validate the assumed fertility schedule, it is not sufficient, as there are other schedules that can meet the same set of constraints. However, the important characteristics of the fertility schedule are: the length of the initial non-bearing period, and the peakedness of the schedule. The one assumed for Table C.1 is fairly flat and should exhibit less sensitivity to perturbing factors than other schedules that could have been constructed.

The death rates d(x) and the fertility rates m(x) probably have the most profound effect on the population and the corresponding net reproduction rate R_o. While a change in death rates will tend to produce proportionate changes in R_o, a change in fertility rates can produce a greater than proportionate change in R_o. For example, a 10 percent increase in the death rate of an otherwise unregulated population would reduce R_o to approximately 1.4. A 30 percent decrease in fertility would reduce R_o from 1.56 to approximately 0.9. An increase in death rate of 10 percent combined with a 30 percent decrease in fertility devises R_o to approximately 0.8. A similar result would obtain if a large fraction of ewes were taken in the regulated hunts. Thus impacts on the ewes themselves or their capability to reproduce will produce equal effects on the population reproduction rate.

These data and the analyses that proceed from them are not entirely conclusive. Other factors should be considered. The fact that the analysis deals with expected values calls into question the minimum size of the population for which these expectations remain reasonably valid. This would in turn depend on the variations in other population stress factors normally to be expected, such as the variation in forage supply. And because of these factors, it may be somewhat difficult to measure the significant parameters of a population from which meaningful life tables can be constructed and population impacts predicted.

TABLE C.1

LIFE AND FERTILITY TABLES FOR DESERT BIGHORN SHEEP ON THE SHEEP RANGE

	Fertility Table				Life Table		
x	d(x)	l(x)	q(x)	e(x)	l'(x)	m(x)*	$l'(x)m(x) = V_x$
0 - 1	66	1000	0.0660	8.7600	1.000	0.00	0.00
2	12	934	.0128	8.3436	0.934	.00	.00
3	14	922	.0151	7.4457	.922	.00	.00
4	12	908	.0132	6.5528	.908	.20	.18
5	32	896	.0357	5.6339	.896	.25	.22
6	49	864	.0567	4.8240	.864	.30	.26
7	81	815	.0993	4.0840	.815	.35	.29
8	71	734	.0967	3.4795	.734	.30	.22
9	91	663	.1372	2.7986	.663	.25	.17
10	112	572	.1958	2.1643	.572	.20	.11
11	186	460	.4043	1.5695	.460	.15	.07
12	132	274	.4817	1.2956	.274	.10	.03
13	88	142	.6197	1.0352	.142	.05	.007
14	37	54	.6851	0.9074	.054	.05	.00
15	12	17	.7057	.7941	.017	.05	.00
16	5	5	1.000	.5000	.005	.05	.00
17	-	0	-	-	.000	.00	.00

$R_o = \Sigma \ell'(x)m(x) = 1.62$**

*Data are not actually available for m_x.

**Since m(x) represents female offspring per female, R_o represents the net reproduction rate of females in the population. For a population that is balanced between males and females, R_o could also be taken as the net reproduction rate of the total population.

APPENDIX D

TURNOVER RATES IN DESERT ENVIRONMENTS

The concept of turnover rate in an environment was probably introduced initially as an aid in explaining the rate of change among living (and sometimes non-living) components of the environment. Most often it refers to the rate at which certain elements move through ecosystem components, or to the rate of change in the population (Appendices B and C). The rate is most often expressed as a ratio of throughput to total content for element cycling, or as a turnover time for populations and bio-mass. An expression of the latter is inherent in the calculation of R_O, as defined in Appendix C. This appendix will deal primarily with the turnover of elements, such as those introduced as portions of live ordnance not recovered, or introduced as sewage.

There is yet another type of turnover that must be appreciated in evaluating the problems associated with arid-lands management or perturbations thereto. This is best expressed as the recovery rate of altered ecosystems, otherwise often referred to as secondary succession. In plain terms, if an environment is altered, how long will it take to adjust and finally return to some sort of stable state?

Since elemental turnover rates are ratios of throughput to total content, the rates are influenced most by the rate of growth among the producers (productivity). Tropical and agricultural systems turn over rapidly because of the natural or managed growth, respectively. The fundamental lack of water in arid environments precludes heavy productivity; thus, turnover is likewise much slower. Walter (1954) found a positive correlation between productivity and rainfall in deserts and woodlands of Africa; also, productivity has most often been demonstrated to be higher in North American non-arid than arid environments (Odum, 1971; Collier, et al., 1973). Also, the turn over times are faster in non-arid environments, leading to a slower recovery time among the arid ecosystems.

Wallace and Romney (1972) reported an average productivity of about 450 kg/ha yearly in the Southern Shrub community of southern Nevada for combined herbaceous and shrubby species, which may be as little as 10 percent of almost any other system for which we have substantial data. Comparative productivity data in terms of energy content are shown in Table D.1.

Assuming a direct relationship (which is probably optimistic) between production and turn over time or rate, the apparent conclusion is that deserts are at least 10 times slower than all communities except the Tundra. This would also suggest that recovery would be equally slow.

Wallace and Romney (1972) generally concluded that yield resulting from added nitrogen to the soil is somewhat controlled by the amount of available water, since they experienced only a slight increase when water was not added. Also, since there was already ample nitrogen in the soil to support annual turn overs, the addition was not particularly effective. There was already more available nitrogen than the plants could assimilate with the amounts of water received each year. In this regard, it is rather unlikely that nitrogen added through adequately installed sewage management systems would have an observable impact, even if it were in the Pinon-Juniper woodland where production may be higher than it is in the Northern Shrub, Southern Shrub, and Salt Desert Shrub communities.

TABLE D.1

ESTIMATED PRIMARY PRODUCTION AMONG SOME MAJOR BIOTIC COMMUNITIES

(Odum, 1971)

Community	Primary Production $kcal/m^2/yr$
Desert	200
Tundra	200
Grasslands	2,500
Dry Forests	2,500
Coniferous Forest	3,000
Moist Forest	8,000
Croplands	12,000
Tropical Forests	20,000

Perhaps the most important factor to consider is the recovery rate, following construction or environmental destruction from live ordnance. The once tent city of Wahmonie persisted on a bajada in southern Nevada for about three years in the mid-1920s. Evidence of this town is still clearly etched in the vegetation, suggesting that it has only begun to stablize, and will require perhaps as much as 200-500 years. Activities in these fragile and inordinately slow communities could be essentially permanent as far as the foreseeable future is concerned. Such things as fires and accumulated ordnance fragments may persist in their effects for many hundreds of years.

Data would suggest that tons of ordnance materials are presently being left at the target sites each year. The rates of turn over among these materials would be almost imperceptible; thus the accumulation could become substantial over a few years. Most interesting may be the potential effect of lead on soil. Delivery of ordnance to test ranges undoubtedly involves lead as in, for example, 20mm ammunition. This lead is inert in the short-term practical sense, but in the long term may eventually become converted to organic lead and assimilated in the biological cycle. This effect is certainly not clear, but one thing is: if there is a negative effect, it will likely be observed long after the accumulation has reached a level so high that recovery is virtually impossible. Also, a summary statement by Wallace and Romney (1971) on the accumulation and effect of lead in desert plants may be an important consideration in the target areas:

> Tetra-ethyl lead additives in vehicle fuel have been shown by several investigators to contaminate the soil and vegetation along side roadway networks and urban areas. The portion of U. S. Highway 95 between Las Vegas and Mercury, Nevada is heavily traveled compared to the portion of equal distance extending further northwest as the result of daily commuter traffic. Lead contamination was apparent in foliage of desert vegetation collected alongside the roadway, reflecting the variation in traffic volume on the two portions of U. S. Highway 95 that was sampled. Lead contents greater than ten-fold of normal were found in plant foliage alongside the heavily-traveled roadway.

Of course, the question is simple: how much lead is being deposited at the target area? However much it is, it will apparently persist for hundreds of years and may eventually affect the upper trophic levels of the ecosystem.

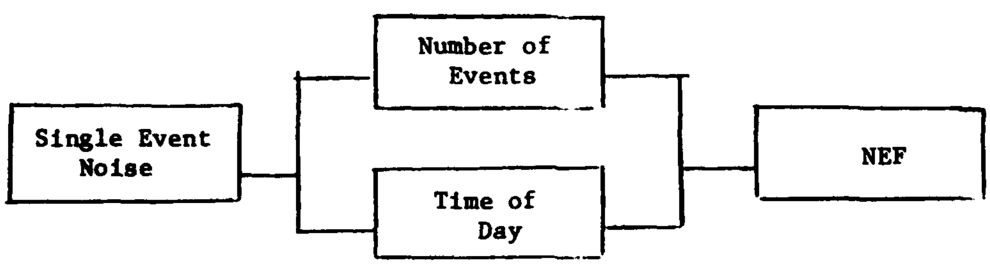
While elements may cycle very slowly through desert ecosystems, populations of plants and animals vary widely. This variation is a response to the local productivity in the case of animals, and rainfall in the case of plants. When the rainfall is sufficient and with an appropriate distribution, production will increase in annual production. Animal species may respond equally dramatically to the high production years, largely by stimulating more active reproduction.

APPENDIX E

NOISE EXPOSURE FORECAST (NEF) METHODOLOGY

Description of the Noise Environment

It is generally recognized that a noise environment description should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. As is typical of the various systems in use throughout the world today, NEF begins with a single event descriptor and adds corrections for the number of events and the time of day. Since the primary concern is residential areas, nighttime events are considered more annoying than daytime events and are weighted accordingly. NEF values are computed from the single event noise descriptor plus corrections for number of flights and time of day.



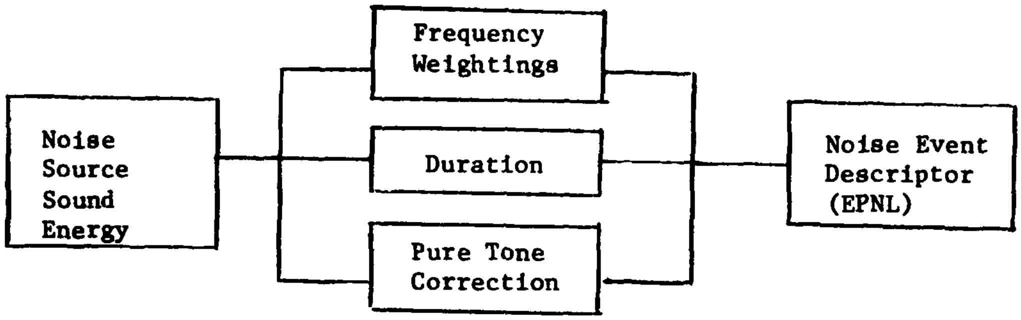
As part of an extensive data collection process, detailed information is gathered on the flight tracks flown by each type of aircraft assigned to the base and the number and time of day of flights on each of these tracks during a "typical" day. This information is used in conjunction with the single event noise descriptor to produce NEF values. These values

are combined on an energy summation basis to provide single NEF values for the mix of aircraft operations at the base. Equal value points are connected to form the contour lines.

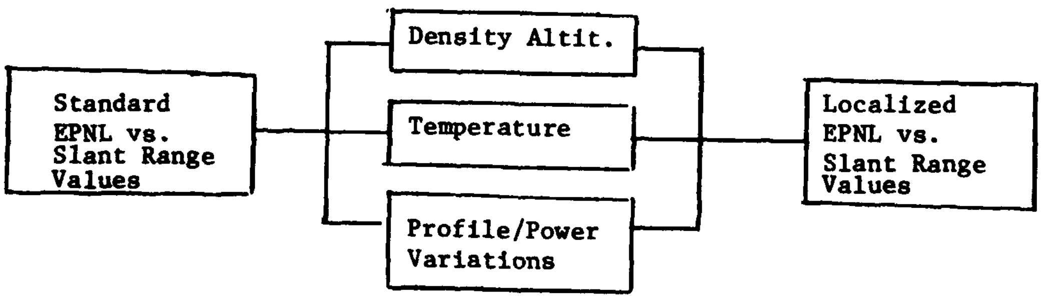
In contrast to the more familiar system of noise assessment, CNR, the NEF system's accuracy is increased since the resulting noise contours are based on incremental numbers of aircraft on each flight track rather than the step function correction factors used by CNR.

Noise Event Descriptor

The single event noise descriptor used in the NEF system is the Effective Perceived Noise Level (EPNL). The EPNL measure is a single value resulting from an analysis in 1/3 or full octave bands of the peak sound energy with considerations included which account for the duration of the sound within these bands and converted for the presence of "pure tones." (Pure tones may be recognized as the characteristic "whine" of turbofan engines.) Frequency, magnitude and duration vary according to aircraft type, engine type, and power setting. Therefore individual aircraft noise data is collected for various types of aircraft/engines at different power settings and phases of flight. The following diagram shows the relationship of the single event noise descriptor (EPNL) to the source sound energy.



EPNL versus slant range values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek and Newman, Inc., in conjunction with the Air Force Aerospace Medical Research Laboratory (AMRL) and carried out by AMRL. These standard day, sea level values form the basis for the individual event noise descriptors at any location and are adjusted to the location by applying appropriate corrections for temperature, density altitude and variations from standard profiles and power settings.



Ground-to-ground sound propagation characteristics are used for altitudes up to 500 feet absolute with a linear transition between 500 and 700 feet and air-to-ground propagation characteristics above 700 feet.

In addition to the assessment of aircraft flight operations, the NEF system also incorporates aircraft and engine ground runup noise resulting from ground engine/aircraft maintenance checks. The following is used: (1) the orientation of the noise source, (2) type of aircraft or engine, (3) number of test runs on a "typical" day, (4) the power settings used and their duration, and (5) use of suppression devices. This data is collected for each ground runup or test position. This information is processed and the noise contribution added (on an energy summation basis) to the noise generated by flying operations to product NEF contours reflecting the overall noise environment with respect to aircraft air and ground operations.

Data describing flight tracks flight profiles, power settings, flight track and profile utilization, and ground runup information by type aircraft/engine is assembled by the individual Air Force Base. These data are screened by the major command, Headquarters Air Force, and trained personnel processing the data for input to a central computer. Flight track and utilization data are loaded into the computer and flight track check plots are generated for verification by the base. After verification and incorporation of any required change, NEF contours are generated by the computer using the base-supplied operational data, and the standard source noise data corrected to local conditions. The computer system plots these contours which are reviewed and prepared for photographic reproduction by specialists.

APPENDIX F

SONIC BOOM CHARACTERISTICS FOR TRC OPERATIONS

Introduction:

This appendix summarizes some estimates of sonic boom intensity and duration that may be experienced at or near ground level from aircraft flying overhead at supersonic speeds, as have taken place on the TRC and as required for projected TRC operations. Estimates of the maximum distances from the ground trace of the flight path at which the boom will be felt (with diminished intensity) are included.

The nature of the problem is illustrated by Figure F.1. Given the characteristics of an airplane in supersonic flight, it is necessary to determine the characteristics of the surrounding pressure disturbances.

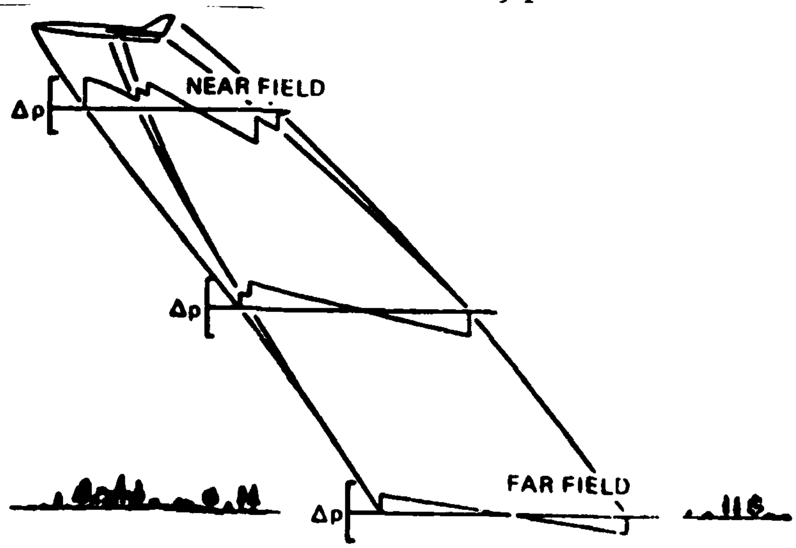


Figure F.1. Sonic Boom Pressure Field

As shown in Figure F.1, the near-field pressure distribution is influenced by several discontinuities in the airplane shape (wing, canopy, engines, tail, etc.) which generate individual shocks. At greater distances from the aircraft these individual shocks coalesce into the bow and stern shock waves, and result in a far-field variation of pressure with time that can be idealized as an "N-wave." The onset of the boom is felt as a sharp increase in air pressure, followed by an essentially linear decrease in pressure to a value below ambient, followed by a sharp return to ambient pressure. The intensity of the boom has been taken as the peak overpressure. The duration of the boom is measured by the time interval between the arrival of the pressure rise and the return from negative pressure to ambient, at a fixed location.

The intensity of the boom decreases with distance of the observer from the aircraft flight path, and the duration increases. The extent or width of the boom on the ground in the direction normal to the flight path was estimated from Figure F.2.[41] The overpressure decreases with lateral distance until the "cut-off" distance is reached, at which point the overpressure decreases to zero and the boom is not audible. Figure F.2 gives the calculated lateral extent of sonic booms on the ground at sea level for a still U. S. standard atmosphere. Wind and temperature variation from the standard influence the lateral extent of the audible sonic boom on the ground as well as the distribution of overpressure. However, for the purposes of this report the lateral

extent of the boom in standard still-air atmospheric conditions, as shown in Figure F.2, was considered adequate with the understanding that specific atmospheric conditions such as temperature inversions can be very important in the propagation.

Calculation of Sonic Boom Overpressure:

Boom Intensity: The method used to calculate boom intensity at the ground directly under the flight path was the "first-cut method" described in Reference 42. The equation given there for boom intensity includes a reflection factor of 1.9 and is:

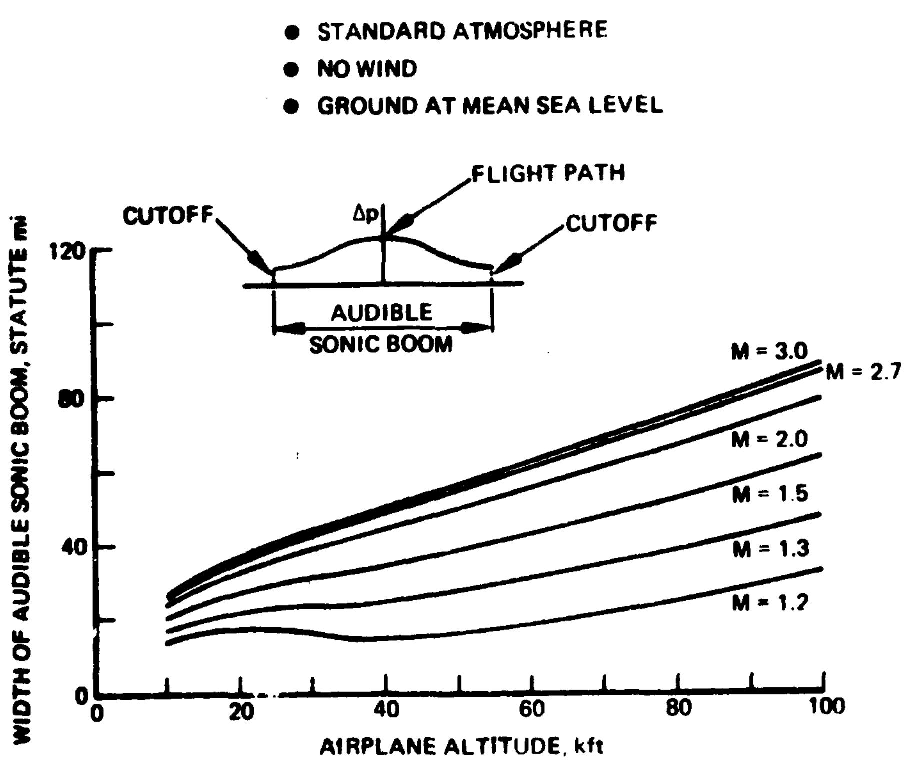


Figure F.2. Width of Audible Sonic Boom on the Ground

$$\Delta p = \frac{1.9 B^{0.25} K_S K_A \sqrt{P_H P_G}}{(h/\ell)^{0.75}}$$

where $B = \sqrt{M^2 - 1}$

M = Flight Mach Number

K_S = Shape Factor (Figure F.3a)

K_A = Atmospheric Factor (Figure F.3b)

P_H = Ambient pressure at flight altitude

P_G = Ambient pressure at ground level

h = Aircraft Altitude Above Ground Level

ℓ = Airplane Reference Length

Boom intensities at positions on the ground not directly under the flight path were calculated by substituting slant range for "h" in the above equation. The shape factor "K_S" was approximated by the following equation:

$$K_S = 0.067 + 2.67 K_L \cos \theta$$

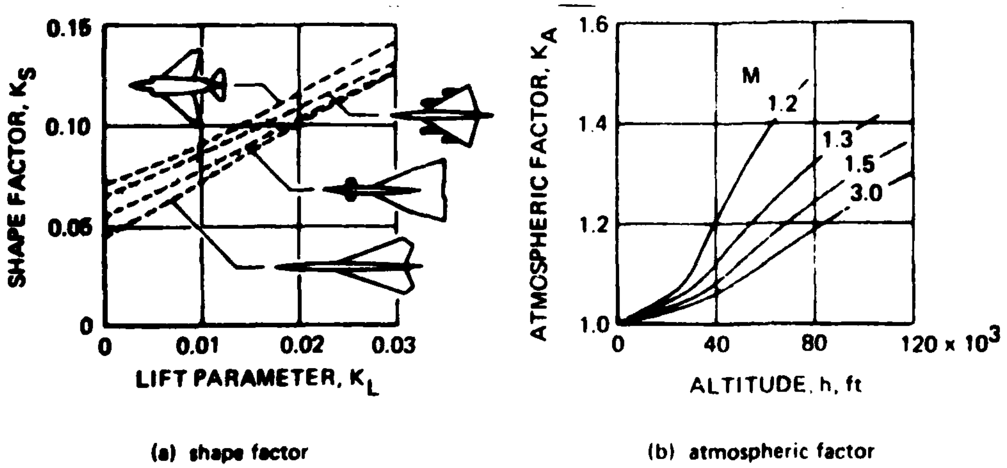


Figure F.3. Sonic Boom Intensity Factors

where $$K_L = \frac{BnW}{\gamma P_M H^2 \ell^2} \quad \text{(the lift parameter)}$$

$\cos\theta = h/r$

h = Distance of Flight Path Above Ground Level

r = Slant Range (measured normal to the flight path)

n = Flight Load or Maneuver Factor

= 1.4

In this way the calculated lift parameter allows for the increase in the contribution of lift to the lift parameter proportional to load factor.

The reduction in the lift contribution to boom intensity with "θ", the angle between the lift vector and the slant range direction (measured normal to the flight path) is also taken into account.

<u>Boom Duration</u>: The N-wave duration was estimated by the relationship:

$$\Delta t = \frac{2(\gamma + 1)\, M s^{0.25}\, \ell^{0.75}\, K_S}{\gamma B^{0.75}\, a_H}$$

where s = Slant Range

a_H = Speed of Sound at Flight Altitude

Cases for Study:

Several cases were chosen for study representing mission profiles appropriate to TRC aircraft. Mission profiles which involved supersonic activity primarily by F-4, F-111, F-104, and F-105 aircraft were selected. These four cases seemed to be representative of practical limits on supersonic activity. However, much of the TRC activities will not involve the flying of complete mission profiles but only particular portions of them, and consequently these limiting cases of supersonic conditions may not apply universally to TRC operations. For example, much supersonic activity that occurs during training is generated in air combat maneuvering engagements, which result in quite different conditions of supersonic flight. Therefore, three more cases for study were added to the original four. For each case it was deemed essential to calculate boom strengths for a maneuvering (typically 5 g's) and a nonmaneuvering case.

Results:

Boom intensities (Δp) and durations (Δt) were estimated for the seven cases as shown in Table F.1. The aircraft parameters which affect the boom are:

Speed

Weight

Load Factor

Reference Length

These require no explanation except fcr the reference lengths, which were obtained by scaling the wing root chord from drawings of the airplanes.

Atmospheric factors required to calculate boom intensity and duration are atmospheric pressure and speed of sound at flight altitude, and atmospheric pressure at ground altitude. These were obtained from standard atmospheric tables.

Table F.1 lists the assumed conditions and the resulting estimates of boom intensity and duration at the ground, directly under the flight path of the airplane. Table F.2 gives the estimated width across the track of the airplane over which the boom would be audible at the ground, and the boom intensity at the cut-off distance.

Figure F.4 shows the variation of boom intensity with cross-track distance for two typical cases.

Figure F.4 - Typical Cross-Track Sonic Boom Intensity Distributions

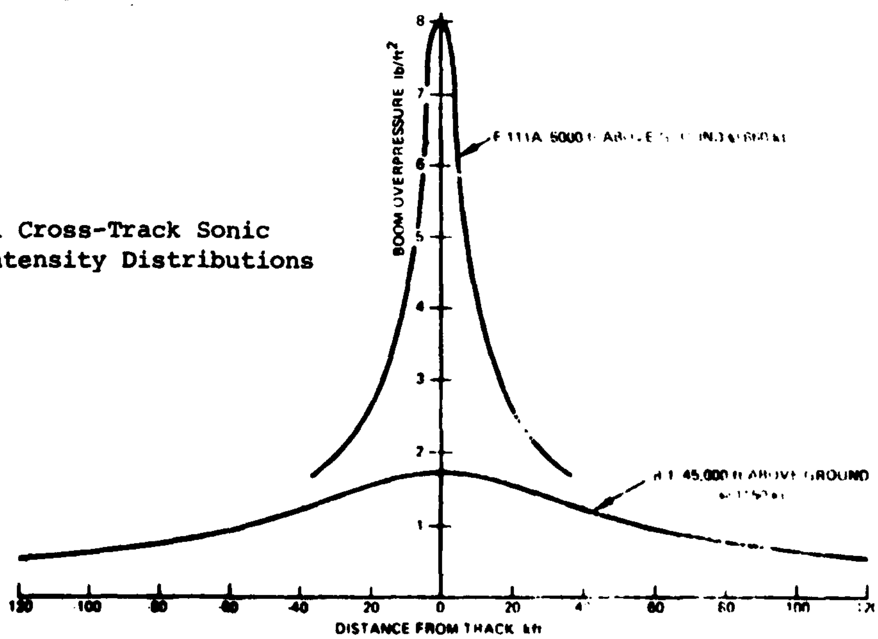


TABLE F.1

SONIC BOOM INTENSITY AND DURATION AT ZERO OFFSET

Case	1		2		3		4		5	6	7
Aircraft	F-4C	F-4C	F-111A	F-111A	F-111A	F-111A	F-104C	F-104C	F-4C	F-111A	F-15
Speed, kt	1,178	1,178	860	860	1,208	1,208	1,150	1,150	—	—	—
Altitude Above MSL, ft	40,000	40,000	10,000	10,000	36,200	36,200	35,000	35,000	15,000	15,000	15,000
Speed of Sound at Altitude, ft/s	968	968	1,077	1,077	968	968	973	973	1,057	1,057	1,057
Mach Number	2.06	2.06	1.35	1.35	2.11	2.11	2.0	2.0	1.4	1.4	1.8
Pressure at Altitude, lb/ft^2	392	392	1,453	1,453	472	472	500	500	1,195	1,195	1,195
Load Factor	1	5	1	5	1	5	1	5	5	5	5
Lift, lb	36,100	1[illegible],500	56,500	282,500	52,800	264,000	19,370	96,850	180,500	282,500	200,000
Reference Length, ft	28	28	61	61	61	61	13	13	28	61	24
K_a	1.10	1.10	1.02	1.02	1.09	1.09	1.09	1.09	1.02	1.02	1.01
Ground Altitude, ft	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Distance Off Track	0	0	0	0	0	0	0	0	0	0	0
Pressure at Ground, lb/ft^2	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760
Δp, lb/ft^2	1.1[illegible]	2.92	8.00	10.2	1.62	2.6	1.08	3.62	5.4	5.8	6.5
Δt, seconds	0.09[illegible]	---	0.061	---	0.11	---	0.068	---	0.09	0.10	0.09

TABLE F.2

SONIC BOOM CUT-OFF WIDTH AND INTENSITY AT CUT-OFF

Case	1		2		3		4		5	6	7
Aircraft	F-4C	F-4C	F-111A	F-111A	F-111A	F-111A	F-104C	F-104C	F-4C	F-111A	F-15
Speed, kt	1,178	1,178	860	860	1,208	1,208	1,150	1,150	---	---	—
Altitude Above MSL, ft	40,000	40,000	10,000	10,000	36,200	36,200	35,000	35,000	15,000	15,000	15,000
Speed of Sound at Altitude, ft/s	968	968	1,077	1,077	968	968	973	973	1,057	1,057	1,057
Mach Number	2.06	2.06	1.35	1.35	2.11	2.11	2.0	2.0	1.4	1.4	1.8
Pressure at Altitude lb/ft^2	392	392	1,453	1,453	472	472	500	500	1,195	1,195	1,195
Load Factor	1	5	1	5	1	5	1	5	5	5	5
Lift, lb	36,100	180,500	56,500	282,500	52,800	264,000	19,370	96,850	180,500	282,500	200,000
Reference Length, ft	28	28	61	61	61	61	13	13	28	61	24
K_a	1.10	1.10	1.02	1.02	1.09	1.09	1.09	1.09	1.02	1.02	1.01
Ground Altitude, ft	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Cut-Off Distance, ft	116,000	116,000	37,000	37,000	105,000	105,000	105,000	105,000	58,080	58,080	71,280
Pressure at Ground, lb/ft^2	1,760	[illegible]	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760
[illegible], lb/ft^2	0.30	[illegible]	1.66	[illegible]	0.55	0.57	0.24	0.50	0.74	1.16	0.64
[illegible]	0.086	---	0.095	---	0.13	---	0.054	---	0.07	0.11	[illegible]
Width of Audible Boom, Statute Miles	44	44	14	14	40	40	40	40	22	22	27

APPENDIX G

TRC AIRSPACE PROPOSAL

Airspace Docket No. 75-WA-21)

ALTERATION OF RESTRICTED AREAS

Notice of Proposed Rule Making

The Federal Aviation Administration (FAA) is considering amendments to Parts 71 and 73 of the Federal Aviation Regulations that would: (1) redefine Restricted Areas R-4807 Tonopah, Nevada, R-4808 Las Vegas, Nevada, and R-4809 Tonopah, Nevada; (2) designate the redefined segments of R-4807 and R-4809 as joint use restricted areas; and (3) include the R-4807 segments and R-4809 in the Continental Control Area. Docket No. 13817, Notice No. 76-5 issued concurrently herewith proposes a related amendment of Part 93 that would establish special air traffic rules for operating areas located adjacent to Nellis Air Force Base (AFB) and the aforementioned restricted areas.

Interested persons may participate in the proposed rule making by submitting such written data, views or arguments as they may desire. Communications should identify the airspace docket number and be submitted in triplicate to the Director, Western Region, Attention: Chief, Air Traffic Division, Federal Aviation Administration, 15000 Aviation Boulevard, P. O. 90009. All communications will be considered before action is taken on the proposed amendments. The proposals

contained in this notice may be changed in the light of comments received.

An official docket will be available for examination by interested persons at the Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket, AGC-24, 800 Independence Avenue, S. W., Washington, D. C. 20591. An informal docket also will be available for examination at the office of the Regional Air Traffic Division Chief. Request for copies of this Notice of Proposed Rule Making should be addressed to the Federal Aviation Administration, Office of Information Services, Attention: Public Information Center, AIS-230, 800 Independence Avenue, S. W., Washington D. C. 20591.

The proposed amendments would:

1. Redefine R-4807 Tonopah, Nevada, as follows:

a. R-4807A Tonopah, Nevada. Boundaries.

Beginning at Lat. 37° 53' 00" North, Long. 116° 30' 00" West; to Lat. 37° 53' 00" North, Long. 116° 11' 00" West; to Lat. 37° 42' 00" North, Long.

116° 11' 00" West; to Lat. 37° 42' 00" North, Long.

115° 53' 00" West; to Lat. 37° 33' 00" North, Long.

115° 53' 00" West; to Lat. 37° 33' 00" North, Long.

116° 30' 00" West; to point of beginning.

Designated altitudes. Unlimited. Time of designation. Continuous. Controling agency. Federal Aviation Administration, Los Angeles ARTC Center. Using agency. USAF Tactical Fighter Weapons Center, Nellis AFB, Nevada.

b. R-4807B Tonopah, Nevada. Boundaries, beginning at:

Lat. 37° 16' 00" North, Long. 116° 00' 00" West to
Lat. 37° 16' 00" North, Long. 116° 30' 00" West to
Lat. 37° 33' 00" North, Long. 116° 30' 00" West to
Lat. 37° 33' 00" North, Long. 115° 48' 00" West to
Lat. 37° 28' 00" North, Long. 115° 48' 00" West to
Lat. 37° 28' 00" North, Long. 116° 00' 00" West to
the point of beginning.

Designated altitudes. Unlimited. Time of designation. Continuous. Controlling agency. Federal Aviation Administration, Los Angeles ARTC Center. Using agency. USAF Tactical Fighter Weapons Center, Nellis AFB, Nevada.

c. R-4807C Tonopah, Nevada. Boundaries.

Beginning at Lat. 37° 33' 00" North, Long.

116° 30' 00" West; to Lat. 36° 51' 00" North, Long.

116° 30' 00" West; to Lat. 36° 51' 00" North, Long.

116° 33' 30" West; to Lat. 37° 26' 30" North, Long.

117° 04' 30" West; to Lat. 37° 33' 00" North, Long.

117° 03' 40" West; to point of beginning.

Designated altitudes. Unlimited. Time of designation. Continuous. Controlling agency. Federal Aviation Administration, Los Angeles ARTC Center. Using agency. USAF Tactical Fighter Weapons Center, Nellis AFB, Nevada.

2. Redefine R-4808 Las Vegas, Nevada, as follows: Boundaries.

Beginning at Lat. 36° 41' 00" North, Long.

115° 56' 00" West; to Lat. 36° 41' 00" North, Long.

116° 26' 30" West; to Lat. 36° 51' 00" North, Long.

116° 26' 30" West; to Lat. 36° 51' 00" North, Long.

116° 30' 00" West; to Lat. 37° 16' 00" North, Long.

116° 30' 00" West; to Lat. 37° 16' 00" North, Long.

116° 00' 00" West; to Lat. 37° 28' 00" North, Long.

116° 00' 00" West; to Lat. 37° 28' 00" North, Long.

115° 35' 00" West; to Lat. 37° 06' 00" North, Long.

115° 35' 00" West; to Lat. 37° 06' 00" North, Long.

115° 56' 00' West; to point of beginning.

Designated altitudes. Unlimited. Time of designation. Continuous. Using agency. Manager, Energy Research and Development Administration, Las Vegas, Nevada.

3. Redefine R-4809 Tonopah, Nevada, as follows: Boundaries.

Beginning at Lat. 37° 53' 00" North, Long.

116° 30' 00" West; to Lat. 37° 33' 00" North, Long.

116° 30' 00" West; to Lat. 37° 33' 00" North, Long. 117° 03' 40" West; to Lat. 37° 53' 00" North, Long. 117° 01' 00" West; to point of beginning.

Designated altitudes. Unlimited. Time of designation. Continuous. Controlling agency. Federal Aviation Administration, Los Angeles ARTC Center. Using agency. Manager. Energy Research and Development Administration, Albuquerque, New Mexico.

Include the following restricted areas in the continental control area: a. R-4807A, b. R-4807B, c. R-4807C, d. R-4809.

The Air Force has a requirement for a controlled operational environment large enough to allow participating aircraft to stimulate combat conditions with the capability to test and evaluate aircrew effectiveness in the delivery of airborne weapons, and the performance of combat tactics at supersonic speeds. The military activities include air-to-air combat maneuvering, air-to-ground attack maneuvering, simulated combat search and rescue, simulated combat tactical airlift, reconnaissance missions at low and intermediate altitudes and at varying speeds, tests of remotely piloted aircraft, and stimulated strategic bombing missions. These missions would be flown by individual aircraft, small formations and, on occasion,

as large-scale exercises. The maneuvers would involve flights at very high speeds, subsonic flights at low altitude, and vertical movement tactics. To accommodate this activity with safety, an area with low densities of population and air traffic is desired. The operating areas proposed for special air traffic rules in Notice No. 76-5 would provide a controlled environment for some of the operations; however, restricted airspace would also be needed where positive control cannot be provided and where the activities would create a hazard for non-participating aircraft. The alterations described in this docket would satisfy the restricted airspace requirement.

As proposed herein, R-4807, R-4809 would be designated for joint use. This would permit their temporary return to public use when the using agency has no requirement for them. Furthermore, subdividing R-4807 and redefining R-4808 and R-4809 would simplify the measures required to effect the return by aligning the area boundaries more closely to the airspace actually used for specific testing or training operations.

These amendments are proposed under the authority of Sec. 307(a) of the Federal Aviation Act of 1958 (49 U. S. C. 1348 (a)) and Sec. 6(c) of the Department of Transportation Act (49 U. S. C. 1655(c)).

William E. Broadwater
Chief, Airspace and Air Traffic Rules Division

(Docket No. 13817; Notice No. 76-5)

NELLIS AFB SPECIAL AIR TRAFFIC RULE

Notice of Proposed Rule Making

NOTE: This document is reprinted without change from the issue of Thursday, March 4, 1976.

The Federal Aviation Administration (FAA) is considering amending Part 93 of the Federal Aviation Regulations (14 CFR Part 93) to establish special air traffic rules for operating areas that would be established adjacent to Nellis Air Force Base (AFB) and Energy Research and Development Administration (ERDA) restricted areas located generally north of Las Vegas, Nevada. Airspace Docket No. 75-WA-21 issued concurrently herewith, proposes related airspace actions that would

alter the descriptions of Nellis AFB and ERDA Restricted Areas R-4807, R-4808 and R-4809, and would make all of the Nellis AFB, and ERDA restricted areas in this complex except R-4808 joint use.

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views, or arguments as they may desire. Communications should identify the regulatory docket or notice number and be submitted in duplicate to: Federal Aviation Administration, Office of the Chief Counsel, Attention: Rules Docket,

AGC-24, 800 Independence Avenue, S. C., Washington D. C. 20491. Comments on the overall environmental impacts of the proposed rule are specifically invited. All communications

will be considered by the Administrator before taking action on the proposed rule. The proposal contained in this notice may be changed in the light of comments received. All comments submitted will be available, both before and after the closing date for comments, in the Rules Docket for examination by interested persons.

The Air Force has a requirement for a controlled operational environment large enough to allow participating aircraft to simulate combat conditions with the capability to test and evaluate aircrew effectiveness in the delivery of airborne weapons, and the performance of combat tactics at supersonic speeds. The military activities include air-to-air combat maneuvering, air-to-ground attack maneuvering, simulated combat search and rescue, simulated

combat tactical airlift, reconnaissance missions at low and intermediate altitudes and at varying speeds, tests of remotely piloted aircraft, and simulated strategic bombing missions. These missions would be flown by individual aircraft, small formations and, on occasion, as large-scale exercises. The operating areas within which the special air traffic rules proposed herein would apply would be used for operational testing under simulated combat conditions. The maneuvers would involve flights at very high speeds, subsonic flights at low altitude, and vertical movement tactics. To accommodate this activity with safety, an area with low densities of population and air traffic is desired. The operating areas proposed herein were selected on that basis.

Each operating area would extend from 100 feet above the surface to, but not including, Flight Level 180. As proposed herein, the public may operate within these areas at all times and at any altitude that would be otherwise available to that aircraft, provided that ATC is notified, prior to entry, of the intended route, and that radio communications with ATC are maintained continuously or to the extent limited by radio reception, while operating within either of these areas. Notification may be accomplished either by filing a flight plan or by an inflight radio communication with ATC, prior to entering the area, identifying the aircraft and its proposed route, including point of entry and exit (or destination), altitude and airspeed.

Several VFR flyways, generally of three nautical miles in width, and extending from 1,500 above the surface to and including 12,500 feet above mean sea level, would traverse each of the two areas primarily to accommodate aircraft not equipped with radios. No prior notice, clearance, or maintenance of communications would be required for any flight operation within these VFR flyways. However, pilots would be encouraged to contact ATC in the interest of safety.

Comments received in response to the advance notice, and forthcoming from approximately 70 meetings held by the Air Force with the public or user groups, raised a number of objections, principally that the proposed operating areas (1) would impede surface activities such as mining, grazing of livestock, hunting, etc.; (2) would preclude or unduly inhibit aerial operations necessary to support mining, geological activities, ranching, and transiting or local flight operations; (3) would have a detrimental effect on airport revenue in Nevada; (4) would increase aircraft operating costs; (5) would be effectively sealed off from the public through failure to establish communications with the appropriate military users; and (6) would not contain a sufficient number of VFR flyways.

The proposed areas should not interfere with any surface activity since they extend no lower than 100 feet above the surface. No ordnance would impact within the proposed areas, and it is not the intention of the Air Force to gain land use rights underlying the proposed operating areas except for certain small leased parcels needed for the installation

of air traffic surveillance radar, communications and operational test equipment, and evaluation and training equipment.

This proposal would not preclude aerial operations necessary to support surface activity nor would it unduly interfere with those activities or other transiting or local flight operations. The Air Force would accommodate public flight operations in the proposed areas by vectoring the military operations around the routes and altitudes as notified by the operators of transiting aircraft. On occasions when large-scale exercises may be scheduled, the public may be requested to avoid certain areas in the interest of safety, but it is the stated intention of the users not to interfere with the route an operator of a civil aircraft has stated that he intends to follow. It is for that reason that prior notification of routes and maintenance of radio communications is required.

This proposal should not have a detrimental effect on airport revenue, nor cause any increase in aircraft operating cost that is not outweighed by the advantages of enhanced flight safety. Flight to or from airports within the areas would not be prohibited nor would routes proposed by the public be restrained except to the extent that a deviation may be recommended occasionally for safety considerations. The operating areas would not become effective until sufficient radar surveillance and communications capability are available to ensure complete separation of aircraft. This communications capability also would assist in providing point-to-point vectoring service. Further, search and rescue capability would likewise be enhanced.

The Air Force agreed with several of the public comments suggesting that the VFR flyways be widened. Therefore, as now proposed, they would be three nautical miles wide (1.5 nautical miles each side of the center-line) except for the east-west flyway underlying V-244 which would have the width of that airway. It is recognized that the possibility exists wherein deviation from a VFR flyway would be necessary to avoid inclement weather or for safety considerations as determined by the pilot. When such deviation occurs, the pilot of an aircraft not having radio communications capability would be expected to take due regard for all other aircraft and return to the VFR flyway as soon as practicable.

The Department of the Air Force has requested that the operating areas be identified as Sadek North and Sadek East, to commemorate Lt Col Louis C. Sadek (deceased) who was instrumental in developing the concept of these operating areas.

A VFR flyway in the Sadek North area aligned along State Highway 93 that was inadvertently omitted from the advance notice is included in this proposal. The using agencies understand that there aircraft would be required to observe the minimum safe altitude requirements prescribed in # 91.79 of Part 91 of the Federal Aviation Regulations.

Authority: (Secs. 307 and 313(a) of the Federal Aviation Act of 1953, (49 U. S. C. 1348 and 1354(a)); and Sec. 6(c) of the Department of Transportation Act, (49 U. S. C. 1655 (c))).

In consideration of the foregoing, it is proposed to amend Part 93 of the Federal Aviation Regulations by adding a new Subpart G to read as follows:

Subpart G - Nellis AFB, Nevada, Operating Areas

93.91 - Applicability: This subpart prescribes the Sadek North and Sadek East operating areas, and the special air traffic rules for operating aircraft within these areas.

93.93 - Description of Areas:

(a) Sadek North.

(1) Boundaries:

Beginning at Lat. 37° 59' 55" North, Long.
116° 38' 10" West; to Lat. 38° 00' 10" North, Long.
116° 33' 30" West; to Lat. 38° 00' 30" North, Long.
116° 33' 45" West; to Lat. 38° 01' 50" North, Long.
116° 19' 45" West; to Lat. 38° 01' 40" North, Long.
115° 58' 00" West; to Lat. 38° 06' 00" North, Long.
115° 28' 00" West; to Lat. 38° 07' 00" North, Long.
115° 18' 00" West; to Lat. 38° 10' 50" North, Long.
114° 24' 30" West; to Lat. 38° 11' 50" North, Long.
114° 27' 30" West; to Lat. 38° 30' 00" North, Long.
114° 35' 15" West; to Lat. 38° 30' 00" North, Long.
116° 38' 00" West; to point of beginning.

Altitude: from 100 feet above the surface to but not including, Flight Level 180. Time: Continuous. Controlling agency: Federal Aviation Administration, Salt Lake City ARTC Center. Using agency: USAF Tactical Fighter Weapons Center, Nellis AFB, Nevada.

(2) VFR Flyways: Extending in altitude from 1,500 feet above the surface to and including 12,500 feet MSL in the following areas:

(a) Flyway A: Beginning at Lat. 38° 30' 00" North, Long. 115° 55' 00" West; thence southwest, 1.5 nautical miles on each side of U. S. Highway 6 to Lat. 38° 08' 30" North, Long. 116° 38' 00" West.

(b) Flyway B: Beginning at Lat. 38° 30' 00" North, Long. 115° 37' 00" West; thence southwest 1.5 nautical miles on each side of a direct line to Lat. 38° 13' 00" North, Long. 115° 48' 00" West.

(c) Flyway C: Beginning at Lat. 38° 30' 00" North, Long. 115° 37' 00" West; thence south, 1.5 nautical miles on each side of State Highway 38 to Lat. 38° 16' 45" North, Long. 115° 01' 45W West.

(d) Flyway D: V-244 and the airspace thereunder extending upward from 1,500 feet above the surface is a VFR flyway for east-west bound traffic between Tonopah, Nevada, and Wilson Creek, Nevada.

(e) Flyway E: Beginning at Lat. 38° 30' 00" North, Long. 114° 38' 55" West; thence south, 1.5 nautical miles on each side of State Highway 93 to Lat. 38° 18' 40" North, Long. 114° 36' 25" West.

(b) Sadek East.

(1) Boundaries, beginning at:

Lat. 37° 17' 00" North, Long. 111° 58' 35" West to

Lat. 37° 31' 00" North, Long. 113° 47' 30" West to

Lat. 37° 36' 00" North, Long. 113° 44' 00" West to

Lat. 37° 41' 00" North, Long. 113° 40' 00" West to

Lat. 37° 52' 20" North, Long. 113° 30' 30" West to

Lat. 38° 10' 50" North, Long. 114° 24' 30" West to

Lat. 38° 06' 00" North, Long. 115° 28' 00" West to

Lat. 38° 01' 40" North, Long. 115° 58' 00" West to

Lat. 38° 01' 50" North, Long. 116° 19' 45" West to

Lat. 38° 00' 30" North, Long. 116° 33' 45" West to

Lat. 38° 00' 10" North, Long. 116° 33' 30" West to

Lat. 37° 59' 55" North, Long. 116° 38' 10" West to

Lat. 37° 53' 00" North, Long. 116° 38' 20" West to

Lat. 37° 53' 00" North, Long. 116° 11' 00" West to

Lat. 37° 42' 00" North, Long. 116° 11' 00" West to

Lat. 37° 42' 00" North, Long. 115° 53' 00" West to

Lat. 37° 33' 00" North, Long. 115° 53' 00" West to

Lat. 37° 33' 00" North, Long. 115° 35' 00" West to

Lat. 37° 17' 00" North, Long. 115° 35' 00" West to

the point of beginning.

Altitude: From 100 feet above the surface to, but not including, Flight Level 180. Time: Continuous. Controlling agency: Federal Aviation Administration, Los Angeles ARTC Center. Using agency: USAF Tactical Fighter Weapons Center, Nellis AFB, Nevada.

(2) VFR Flyways: Extending in altitude from 1,500 feet above the surface to and including 12,500 feet MSL in the following areas:

(a) Flyway A: Beginning at Lat. 38° 01' 10" North, Long. 116° 04' 05" West, thence south 1.5 nautical miles on each side of State Highway 25 to Lat. 37° 32' 05" North, Long. 115° 14' 05" West.

(b) Flyway B: Beginning at Lat. 37° 17' 00" North, Long. 115° 07' 00" West; thence North 1.5 nautical miles on each side of U.S. Highway 93 to Lat. 37° 31' 40" North, Long. 115° 13' 30" West; thence northwest 1.5 nautical miles on each side of State Highway 25 to Lat. 37° 32' 00" North, Long. 115° 14' 00" West; thence north 1.5 nautical miles on each side of State Highway 38 to Lat. 38° 08' 30" North, Long. 114° 58' 05" West.

(c) Flyway C: Beginning at Lat. 37° 17' 00" North, Long. 114° 28' 25" West; thence north 1.5 nautical miles on each side of the Union Pacific railraod track to Caliente, Nevada; thence north 1.5 nautical miles on each side of U. S. Highway 93 to Lat. 38° 10' 05" North, Long, 114° 35' 20" West.

(d) Flyway D: Beginning at Lat. 37° 47' 30" North, Long. 114° 24' 30" West; thence east 1.5 nautical miles on each side of U. S. Highway 25 to Modena, Utah, thence northeast 1.5 nautical miles on each side of the Union Pacific railroad track to Lat. 37° 54' 20" North, Long. 113° 37' 30" West.

93.95 - Aircraft Operations: Except when operating within a VFR flyway, no person may operate an aircraft in flight within an operating area prescribed in # 93.93 of this subpart unless --

(a) Before operating within that area, that person notifies an appropriate ATC facility of his intended flight route therein, including identification of aircraft, point of entry and exit or destination, altitude and airspeed; and

(b) That person maintains two-way radio communications with an appropriate ATC facility while operating within that area.

Issued in Washington D. C., on February 27, 1976.

Glen D. Tigner
Acting Director, Air Traffic Service

ANNEX A

PUBLIC AGENCIES COMMENTS ON THE

DRAFT ENVIRONMENTAL STATEMENT

AND AIR FORCE RESPONSES

In accordance with Section 102(2)(c) of the National Environmental Protection Act, copies of the Draft Environmental Statement for the Continental Operations Range (COR) were provided various public agencies for their review and comments. Each of the letters received from these agencies was reproduced and included in this annex. Following each of these letters are the Air Force responses to the comments from the agency. The comments and applicable responses have been annotated with numbers to facilitate their correlation. The responses have been annotated with section or page numbers as an index to the Statement wherein information pertinent to the subject is contained.

It should be recognized that the comments contained in this annex were addressed to the COR Draft Environmental Statement. The utilization and proposals for the TFWC Range Complex (TRC) are similar to those planned for the TRC under the near-term COR concept. Therefore, most of the public agencies comments contained in this annex are applicable to the TRC utilization and proposals contained in this Final Environmental Statement. For those comments which addressed areas applicable to COR, but are no longer applicable to TRC, the Air Force responses are so indicate. Responses contained in this annex are based on the content of this Final Environmental Statement (FES) for the TRC.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

SEP 5 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
SAF/ILE
Washington DC 20330

Dear Dr. Welch:

(1) The Environmental Protection Agency has received and reviewed the draft environmental impact statement for the following proposed action: Continental Operations Range, States of Nevada and Utah.

EPA's comments on the draft statement have been classified as Category LO-2, specifically lack of objections pending resolution of certain deficiencies in the environmental statement. Definitions of the categories are provided on the enclosure and our extensive comments are presented in the second enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the impact statement at the draft stage.

EPA appreciates the opportunity to comment on this draft statement and requests two copies of the final statement when available.

Sincerely,

Paul De Falco, Jr.
Regional Administrator

Enclosures

cc: Council on Environmental Quality, Wash., D.C. 20460
Attn: Editor, 102 Monitor (10 copies)

Comments on the Proposed Nellis Range.

(2) Electromagnetic Radiations

The draft statement recognizes the potential problems that can arise from electromagnetic emanations and discusses the topic in depth. It appears that any significant problems can be avoided provided appropriate safety procedures are followed. Specific comments are: (1) On page 1-14 there is a typo on units, it should be 10 mw/cm^2 (not n); (2) there may be non thermal health effects below the 10 mw/cm^2 exposure level. In fact, Russian and Eastern European countries have set standards as low as 0.01 mw/cm^2. There is presently a multi-million dollar federally funded research effort, coordinated by the Electromagnetic Radiation Management Advisory Council (ERMAC), that is seeking to answer this uncertainty; and (3) interferences with pacemakers have been reported at power densities as low as 0.3 micro $watts/cm^2$ with a simulated radar pulse.

Noise

(3) More data on noise levels at Nellis AFB is necessary to more fully evaluate the environmental impact of the proposed action. CNR (NEF) contours, both existing and projected should be developed and presented in the final environmental statements.

(4) The environmental statement presents the concept of "quality of life" in Nevada which is derived, in part, from the values of "vastness" and "stillness." The Air Force operations constitute a significant intrusion into this solitude. While EPA recognizes that people may accommodate to a degraded noise environment, EPA is concerned with the philosophy expressed in this statement that the noise effects of increased operations will be tolerated and "it is not expected that any significant level of noise complaints will arise."

(5) On page 4-40 it is noted that flyovers of small towns (i.e. Pioche, Panaca, or Caliente) at 5,000 ft above ground level and cruise power may produce effective perceived noise levels of 75 to 90 EPNdB. EPA is concerned that in cases of: high engine power settings during takeoff; afterburner levels; or where actual sonic booms result, the noise effects on residents will be significant. EPA recommends that rather than study the problem further, procedures to restrict aircraft operations over small towns be formulated and set forth as a part of the final environmental statement.

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

Response to Environmental Protection Agency Comments

(1) The Air Force is grateful for EPA's review of the Draft Environmental Statement. Two copies of the final statement will be provided as requested.

(2) The typographical error on units have been corrected. It is true that non-thermal effects below 10 mW/cm^2 have been reported both in US literature and that from the Soviet Union and Eastern Europe. In apparent recognition of these reports, standards of the Soviet Union and Eastern Europe have been set at much lower levels than those adopted in this country. Researchers in this country feel that the experiments leading to these standards have not been properly controlled and therefore may not be reliable. However, it would seem that reasonable conservatism would dictate that we view the 10 mW/cm^2 with some degree of caution until the results of the present research efforts are made known and subsequently acted upon. Consequently, implementation plans for TRC equipment installations and range safety will consider reasonable safety factors in utilizing the 10 mW/cm^2 criterion. However, for the quantification of probable impacts the 10 mW/cm^2 provides a criterion above which we can begin to expect effects based on well founded experimental results. (Section 3B)

Much the same situation prevails in the case of establishing a reasonable criterion for the electric field strength at which cardiac pacemakers may begin to be adversely affected. Studies conducted by the Air Force have shown instances where quite low field strengths have affected pacemaker operation although no instances of effects at levels as low as .3 $microwatts/cm^2$ have been found. However, variability in pacemaker sensitivity is great and it is conceivable that such a sensitive unit may have been produced. Such a sensitive unit could easily be adversely affected by a multitude of commonly employed devices. Indeed, average ambient field strengths in metropolitan regions have been reported at much higher levels. Such a sensitive pacemaker would pose an undue hazard in almost any ordinary human environment. The Air Force well recognizes the

potential problems in this regard entailed with the use of their radar equipments, and TRC safety procedures will be careful to address them fully and completely. (Section 3B and 5C)

(3) A discussion of the noise levels at Nellis AFB begins on page 3-33 of the FES. The data contained in this section was extracted from the Air Installation Compatible Use Zone (AICUZ) Study, September 1974, for Nellis AFB. Figure C-2 presents the Noise Exposure Forecasts (NEF) contours for the existing aircraft operations at Nellis AFB. The AICUZ study has been provided to communities near Nellis AFB for their consideration in land use planning and controls. The bulk of the area near Nellis AFB has not developed in conflict with the base operations, and as a result of previous planning activities, primarily by Clark County, many of the noise and accident conflicts which might have developed in the Nellis AFB environs have already been resolved.

Projected future aircraft operations at Nellis AFB are not anticipated to result in any substantial change in the noise levels from those at present. Therefore, there is no need to develop revised NEF contours for projected future operations. At such time that future planning indicates aircraft operations might result in substantial changes to the noise levels, the Air Force will develop and present revised NEF contours.

(4) The Air Force recognizes the "quality of life" attributes of solitude, stillness and vastness that exist throughout Nevada in general. However, these are qualities not easily measured or quantified. Perception of these qualities and quantification of that perception is a highly subjective

process which poses fundamental difficulties to assessment of impacts on them. By some views any man-made noise intrusions can significantly detract from these qualities, but again the degree and frequency of adverse incidences is difficult to establish. We have tried to relate TRC noise intrusions to the history of noise occurrences that must have prevailed in the past and up to the present. In this regard, TRC activities will cause only a modest increase in existing air activity with some redistribution of the activity, most notably occurring over the presently restricted TRC land areas. Our assessment that no significant level of noise complaints will arise is based on quantifications for community noise exposure where we have tried to discount the normally expected noise exposure responses for the condition of an otherwise unusually low background noise level. It is true that these assessments are somewhat speculative, but virtually no studies of community responses to noise exposure that would be appropriate for rural Nevada communities have been conducted. (Pages 3-39 and 3-40)

(5) The calculated noise level contained in this Final Environmental Statement is the maximum that would occur when present operational restrictions are observed. There will be no takeoffs or landings of military aircraft (except helicopters) within the TRC. Existing operational restrictions require that supersonic activity avoid populated areas. (Pages 3-23, 3-39 and 3-4D)

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Washington, D.C. 20250

8420

AUG 15 1974

Billy E. Welch, Ph.D.
Special Assistant for
Environmental Quality
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

(1) The Office of the Secretary has sent the Draft Environmental Statement on the Proposed Continental Operations Range to the Forest Service for review.

The Air Force has done an excellent job on this draft environmental statement. The impacts are very well assessed. Some of the economic, social, and ecological data presented will be useful to the National Forests in Nevada in preparing their land use plans.

We have the following comments to offer:

(2) 1. Page 3-3. The use of small portions of National Forest land can be handled by the Air Force working directly with the District Ranger and Forest Supervisor of the Humboldt National Forest. It is possible that a supplemental memorandum of understanding under the Joint Policy Statement between the Department of the Air Force and the Department of Agriculture dated September 12, 1951, (FSM 1533.11--1) would be sufficient to cover the use of National Forest lands. The Regional Forester has authority to issue permits. If it is necessary to withdraw the land from mineral entry, the Forest Service rather than the Bureau of Land Management, as expressed in the statement, should initiate the action.

(3) All of the uplands on the Quinn Division of the Humboldt National Forest are within an inventoried roadless area. An environmental statement would be required prior to construction of roads and/or electronic facilities.

6200 11b

(4) 2. Page 4-7. In addition to fire reconnaissance, the Forest Service may have initial fire attack flights (both helicopter and fixed wing) or fire supply missions to fly in the area. We would appreciate being able to directly contact a specific Air Force office in order to coordinate our air activities and avoid mixing low-level flights.

We appreciate the opportunity to review and comment on this environmental statement.

Sincerely,

R. MAX PETERSON
Deputy Chief

Responses to US Forest Service Comments

(1) The Air Force appreciates the review by the US Forest Service and is gratified that the Forest Service finds the data in the document useful in the conduct of their duties.

(2) We have reviewed the US Forest Service Manual regarding policies for granting special use permits to DoD entities and concur that most, if not all, COR requirements for locating electronic equipments on small parcels of US Forest lands can be handled by existing policy directives. The text in the body of the Environmental Statement has been changed to reflect this view. Environmental assessments will be prepared covering each individual proposed equipment location to properly account for unique features and other uses indigenous to each forest area. (Page 2-3)

Also, it is our understanding that although the Forest Service would initiate formal land withdrawals, the processing, review, and disposition of all such applications resides with the Bureau of Land Management.

(3) The Final Environmental Statement has been revised to recognize the indicated area as being within an inventoried roadless area and the requirement for preparation of an environmental assessment or statement prior to any construction. (Page 2-4)

(4) We thank the US Forest Service for pointing out their uses of air-space for reconnaissance and control of forest fires. The BLM has similar airspace use requirements for fire control as well as stock management on their lands. This information has been incorporated in the FES and the effects of COR on these airspace uses has been analyzed. (Pages 3-4 to 3-6) With knowledge of Forest Service operating requirements, the Air Force foresees no circumstance which would preclude effective accomplishment of

the Forest Service mission. For coordination of air activities, it is requested that the Office of Regional Forester contact the Director of Operations, Continental Operations Range, (COR Gp/DO), Nellis AFB, Nevada 89191, or telephone (702) 643-4194. (Pages 3-4)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20201

AUG 23 1974

Dr. Billy E. Welch
Special Assistant for
Environmental Quality
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

(1) We have reviewed the draft Environmental Impact Statement on the proposed Continental Operations Range. Our main concern is on the far-term effects on the town of Tonopah The problems resulting from the increase in population are well identified. However, where school capacity will be exceeded because of the 15% increase in students, and the existing waste treatment facilities are inadequate, we would like to be assured that local and state people have been apprised of the situation so that plans to alleviate the conditions can begin.

Thank you for the opportunity to review this statement.

Sincerely,

Charles Cu...
Director
Office of Environmental Affairs

Response to Department of Health, Education and Welfare Comments:

(1) The Air Force is grateful for the Department of Health, Education and Welfare review of the Draft Environmental Statement. However, since that time the Air Force plans have changed regarding the location of additional manning in support of TRC operations. Present plans provide for the additional TRC personnel to be located at Nellis AFB. Therefore, the sections of the Statement which previously addressed this area are no longer contained in this Final Environmental Statement.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 4850, Reno, Nevada 89505

August 2, 1974

Dr. Billy E. Welch
Special Assistant for
Environmental Quality
SAF/ILE
Washington, D. C. 20330

Dear Dr. Welch:

(1) The draft environmental impact statement for Proposed Continental Operations Range, in the Great Basin region, that was addressed to the Soil Conservation Service on July 2, 1974 was referred to us for review and comment.

We have reviewed this impact statement and we have no comments to make.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

C A Krall

C. A. Krall
State Conservationist

Responses to the Department of Agriculture, Soil Conservation Service Comments

(1) The Air Force is grateful for the review of the Draft Environmental Statement by the Soil Conservation Service.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

AUG 9 1974

In reply refer to
ER-74/863

Dear Dr. Welch:

This is to confirm our telephone conversation of August 6, 1974, that we will not be able to meet your requested date for the review of the draft environmental statement for the proposed Continental Operations Range, United States Air Force, Utah, Nevada.

We find that there will be substantive comments on the proposal and that we will make ever effort to get the comments to you during the last week of August.

Sincerely yours,

Bruce Blanchard, Director
Environmental Project Review

Dr. Billy E. Welch
Special Assistant for
Environmental Quality
Office of the Assistant Secretary
Department of the Air Force
Washington, D. C. 20330

United States Department of the Interior

OFFICE OF THE SECRETARY

MISSOURI BASIN REGION
DENVER, COLORADO 80225

In reply refer to
ER 74/863

AUG 2 7 1974

Dr. Billy E. Welch
Special Assistant for
Environmental Quality
Office of the Assistant Secretary
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

The following comments are provided in response to your letter of June 27 for review of the draft environmental statement for the proposed Continental Operations Range, United States Air Force, Utah, Nevada.

General Comments.

(1) We feel this statement inadequately describes the environmental impacts of this project. The description of the effects on land use, primitive values, open space and aesthetics requires substantially more study and analysis. Throughout the statement, lack of specific information detracts from the statement's overall credibility and objectivity.

Introduction and Summary.

(2) Page 1-1: It is stated that, "No new restrictions are to be requested for lands within this region; however, the proposed COR will necessitate a restructuring of some of the airspace use in the region..." This is in direct conflict with the statement on page 3-1, which states, "Similarly, land withdrawals for Bureau of Land Management lands may be sought."

(3) Pages 1-9 and 1-18: Although access roads, excavations, various structures and base improvements will be constructed, these projects are not described, locations are not given, and environmental impacts are not specified beyond the generality that, "construction on remote desert lands could...have persistent effects" (p. 1-18). Erosion is acknowledged as a possible consequence of road construction, but no specific situations are described nor mitigative measures discussed.

(4) Page 1-11, last paragraph, "COR may have needs for additional very small withdrawals for sites..." Statements made by Air Force at meeting in Reno in August, 1974 indicated that Air Force anticipates procurement of probably more than five sites but not more than 20 sites. Sites to approximate five acres in size.

Description of the Proposed Action and Related Environment.

(5) Page 2-7: First complete paragraph quotes, "over 90 percent of the area to the north was public domain wasteland..." The word wasteland should be deleted.

(6) Page 2-41: It is stated that, "The Hill/Wendover/Dugway complex is to be further developed in the mid-term to include a separate integrated communication system." Where will these complexes be located and who is the landowner? Or manager?

(7) Page 2-58: The rate of accumulation of ordnance near target areas is variously described as 1,400 tons per year (p. 2-58) and 600 tons per year (p. D-3). The possibility of killing animals (p. 4-45) and a long-term potential for lead poisoning (p. D-3) are mentioned, but otherwise there is no discussion of the consequences of the desert terrain being impacted by bombs and shells. The areal extent of impacts, the intensity of impact within these areas, cratering, and other direct effects, as well as secondary results such as erosion, should be discussed.

(8) Page 2-82: It is stated that only 500-600 wild horses and five burros are in Utah. We strongly suggest that the Department of the Air Force contact the Bureau of Land Management in Utah to determine the precise wild horse and burro information as well as management implications of the proposed project upon these animals.

(9) Page 2-89: The Deep Creek Mountain Range is mentioned, but it is omitted from all maps and all discussions. This area is currently under consideration for designation under 43 CFR, Subpart 2071 as a natural environmental area, primitive area, outstanding natural area, general outdoor recreation area, and historic and cultural sites. The second highest peak in the state of Utah is located in this area. The Deep Creek area also contains relatively rare bristlecone pine as well as a subspecies of cutthroat trout which was thought to be extinct until recent samplings uncovered this species. Efforts are currently underway to have this fish placed on the Department of the Interior's list of species threatened with extinction.

(10) The COR area also contains Peregrine falcons which are listed on the endangered species list of the United States. Any actions that would be detrimental to the species by any Federal agency would violate the Endangered Species Act.

(11) Pages 2-130 through 2-136: The distribution maps for flora and fauna are completely inadequate for the State of Utah as they do not go far enough north to include the Hill/Wendover/Dugway complex.

(12) Relationship of the Proposed Action to Land Use and Policies.

Pages 3-2 and 3-3: The second and forth paragraphs on this page need some rewording and clarification of meaning. We suggest this rewording of the second paragraph, "The simplest form of site use involves a temporary agreement between the authorized office of another agency and, for example, a District Manager of one of the Bureau of Land Management district offices. The agreements are clearly for temporary use. An Environmental Analysis Record is made regarding the use to determine if there is a significant impact on the environment, in which case a formal environmental impact statement might be requested for the site."

(13) Suggested rewording of the fourth paragraph, "The National Environmental Policy Act of 1969 has caused the Bureau of Land Management to be sensitive to any proposed use on the public lands that might cause a significant impact on the environment. Evidence for this is found in documents dealing with a special land use application submitted by Hill Air Force Base for 160 acres in Western Utah, demonstrating the care with which the Bureau of Land Management examines such applications. Included in the documents are analyses of effects on the immediate environment, visual effect, and views of local residents, particularly owners of ranches in the area. Carefully drawn stipulations are included in the proposed ultimate agreement." Deletion of the last sentence in the paragraph is suggested.

(14) Page 3-6: The second paragraph down on the page discusses impacts and mitigative measures. The latter should be presented separately in the mitigative measures section of the statement.

Probable Impacts of the Proposed Action.

(15) Page 4-7: Impacts to the Forest Service and the Bureau of Land Management should be enlarged upon here. The following data is offered for your consideration regarding the Bureau of Land Management.

1. High Fire Hazard Areas
   - A. COR North
     1. Quinn Mountain Range (administered by Humboldt National Forest)
     2. Blue Eagle Mountain
     3. Wayne Kirch Wildlife Management Area
     4. South Egan Range
     5. South Schell Creek Range

B. COR East
   1. Wilson Creek Range
   2. Bristol Range
   3. Highland Range
   4. Cedar Range
   5. Clover Mountains
   6. Delmar Mountains

C. Western Portion of Salt Lake District

2. Fire Occurrence - (average from 1970 - 1973)
Ely District - 30 per year
Las Vegas District - 20 per year
Salt Lake District - 60 per year

3. Frequency of BLM Aviation Operations in the COR Area

*	Fire Recon and Control (average 1970 - 1973)	180 hrs.
**	Wild Horse Management	300 hrs.
**	Livestock Management and Other Flights	85 hrs.
		565 hrs. spent

* During months of June through September
** Yearlong
(All flights average two hours each.)

(16) Page 4-41: This entire section appears to be weak regarding impacts. Numbers of animals or birds affected, migration routes involved, etc., should be part of the discussion of impacts here. No mention is made of the probable impact on wild horses.

(17) Page 4-44: We are concerned about the adverse effects that this project may have on the archeological resources of the area, particularly the effects associated with the construction, including road construction, on undeveloped land and with the new target sites on the North Range. Since the primary construction in the Continental Operations Range will likely involve some roads and instrument trailer pads (p. 4-44), some of which will entail the use of undeveloped land, the proposed rights-of-way and borrow and disposal sites, and the construction areas of these projects should be intensively surveyed by a competent, professional archeologist during the planning stages and well in advance of any construction activities. His findings and recommendations should be included in the final statement and if significant archeological resources are identified, they should be described and evaluated for their National Register potential.

The new target sites in the North Range should also be surveyed by a professional archeologist and his findings and recommendations included in the final statement. If significant archeological resources are identified, they should be described and evaluated for their National Register

potential and if alternate target sites or the construction areas qualify for nomination to the National Register, compliance should be made with title 36, CFR, part 800.

Mitigation measures should be designed to preserve the greatest amount of information and material from the archeological resource base. Therefore, in case sites with National Register potential or with research values are found in the construction or target areas, there should be mechanisms for deciding whether or not a redesign or relocation of the project might be more appropriate than salvage excavation. There should be serious consideration given to preservation of such resources as opposed to merely salvage.

Copies of any archeological reports obtained should be made available to the National Park Service in accordance with Section 3a of Public Law 93-291.

(18) Page 4-57: There is no section expressly devoted to impacts on water resources. Scattered references, such as those on pages 1-16, 2-37, 2-76, 4-57 and 4-58, suggest impacts on water resources without actual evaluation. The impact of COR-related population changes on sewage and waste-water systems in particular seems to merit evaluation in the case of each of the communities involved. In addition, the impact of ordnance testing, such as that done at the Hill/Wendover/Dugway test ranges, on water resources should be evaluated and included in the environmental statement.

Alternatives to the Proposed Action.

(19) Page 5-9: This alternative appears to be a justification for the proposed action.

Unavoidable Adverse Impacts and Mitigative Measures.

(20) Page 6-1: This section presents very general information and says nothing in the way of providing mitigating measures for the protection of wildlife, wild horses, recreational values, etc. in the proposed COR area.

Irreversible and Irretrievable Commitments of Resources.

(21) Page 8-1: We do not agree with the statement in the last paragraph, "the effect of the proposed COR would be insignificant in terms of the commitment that has already occurred." It appears that a unique recreation value such as the solitude of the desert, wildlife habitat and wild horse populations and ranges could all be affected by the COR proposal and conceivably be lost.

Details of Unresolved Controversies.

(22) Page 9-1: We feel that this discussion presents an incorrect conclusion. There are several unresolved controversies; i.e., the impact on fire suppression of restricting the airspace; the effects of sonic booms on sage grouse during the breeding season; the problem of trespass cattle on existing ranges; the ability and desire of the small communities to handle the temporary influx of people.

Offsetting Factors and the Consideration of Other Agencies.

(23) Page 10-2: The statement, "The restricted land areas of the Nellis range pose problems for poachers and provide non-competitive range sanctuaries and consequently are extremely helpful in the management of the wild horse herds." is incorrect. The restricted areas make livestock and wild horse management extremely difficult.

We appreciated the opportunity to review this draft statement. We hope that our comments will be beneficial to you in preparing the final draft of the EIS.

Sincerely yours,

Special Assistant
to the Secretary

Responses to the Department of Interior Comments

(1) The Air Force is grateful for the review of the Draft Environmental Statement performed by the Department of Interior. The list of detailed comments has aided materially in improving the adequacy of the Statement.

(2) We have modified the Statement to reflect that no new airspace derived land restrictions are to be requested, but that use of a number of small isolated parcels outside currently restricted lands could be required for electronic equipment installations.

(3) Planning has not progressed to the point that details regarding construction of access road and equipment installations are established with sufficient accuracy to enable detail assessment of the effects and impacts. Section 3E of this Statement contains a discussion of this subject. As indicated therein, environmental considerations will be included in the engineering of construction activities to avoid adverse impacts as much as possible.

(4) The section of the Statement discussing electronic warfare ranges (beginning on page 1-10) indicates that the 20 simulators now possessed will be increased to over 200. It also indicates these simulators are mobile, which permits periodic relocation. As a result, it is not possible to project the number of locations of this equipment which will require land withdrawals. Beginning on page 8-3 of the assessment are the procedures to be followed in requesting withdrawals of land for any purpose.

(5) The Air Force apologizes for the derogatory connotation in the use of the word "wasteland"; it was not intended and the word has been stricken.

(6) The Continental Operations Range (COR) proposal included the Hill/ Wendover/Dugway Complex and was contained in the Draft Environmental Statement. Since then the Air Force has reduced the scope of its range concept so that the above areas are no longer included and therefore are not addressed in this Final Environmental Statement.

(7) Live ordnance detonated at the ground surface produces craters in size proportional to the weight of explosive. The disturbance of soil and vegetation within and near the crater is complete. Consequently, the past and present uses of target sites on the range have subjected the areas immediately around the site to continuing disturbances to the extent that the environmental state is a function of its previous test uses. We have presumed that continuing disturbance has produced an effective steady state for the target environment, with the exception that accumulation of spent ordnance remains is probably producing an increasing density of such remains and it is not necessarily safe to assume that long term effects have been made evident because of the inherently slow turnover rates for desert environments. Nonetheless, because TRC activities with regard to ordnance expenditures remains virtually unchanged from past and present activities, with respect to both amounts and target locations, we have assumed that the increase in direct effects is negligible.

With respect to air quality and water quality impacts arising from ordnance expenditures, we have based our assessment of negligible impact on the analyses of Air Force munitions testing at Hill AFB. A significantly

greater amount of explosive ordnance is expended there with the conclusion that the air quality and water quality impacts were indeed minor. The similarity of terrain and natural environmental circumstances of target sites at Hill AFB Range and the TRC allows us to reasonably infer that these impacts at the TRC will be negligible.

(8) As the scope of the range area has been reduced from that originally contained in the COR proposal, as indicated in (6) above, this Statement no longer addresses the numbers of wild horses and burros in Utah.

(9) No longer addressed in this Statement due to reduction in scope indicated in (6) above.

(10) We concur with the Department of Interior's statements concerning the Peregrine Falcon and the information is included in the Statement. (Pages 1-76 and 1-87 and Appendix A)

(11) Not included in this Statement due to the reduction in scope indicated in (6) above.

(12) and (13) These areas have been rewritten to incorporate some of the suggested rewording. (Section 2A)

(14) We have changed the wording to emphasize the relationship between TRC activities and Nevada State Plans and Policies for recreational areas and to avoid a premature assessment of an impact with mitigative measures. (Section 2D)

(15) We are thankful for the information provided by the Department of Interior on its uses of air space for fire reconnaissance and control and for livestock management. We have utilized this information along with similar information from the US Forest Service and the Nevada State Department of Fish and Game to revise the Final Environmental Statement. (Pages 3-4 thru 3-6)

(16) As we have noted in the impacts from both sonic booms and jet engine noise there is an extreme paucity of data with regard to animal responses to these two environmental disturbances. The data are more meager for wild animals than for domestic ones, and it appears that much of the more quantitative data on the effects of noise and sonic booms have been generated for circumstances involving actual or potential civil and economic damages. Since we are primarily concerned with TRC induced noise and sonic boom levels that are generally well below those at which some known direct physiological effects may occur, the problem of impact assessment is somewhat more difficult than estimating direct losses in certain species. Accordingly we have tried, through careful investigation of the literature, to determine what animal responses in general may occur due to TRC activities. Some of the effects may be quite transitory or relatively innocuous apart from any particular eco system context; however, we do feel some caution is warranted with regard to subtle shifts that may be induced in the ecological balances. Since basically the same activities have been ongoing at the TRC Range for an extensive number of years, many of the impacts for which we seek knowledge have undoubtedly occurred (to whatever degree) but effectively been unobserved. Available information, which is quite cursory in nature, suggest that the impacts have been probably negligible. Nevertheless the Air Force has the obligation and capability within the Nellis AFB command to protect the environment as best it can against any damages that could result from its activities. The same obligation and capability will attend the development and operation of TRC In the discharge of its obligations TRC will take care to coordinate its activities with outside agencies like the BLM that are vitally interested in ongoing environmental monitoring and analyses. To this end the US Air Force, Nellis AFB, has negotiated a Memorandum of Understanding with the Nevada State Clearinghouse to coordinate the exchange of information pursuant to the National Environmental Policy Act of 1969 and the Office of Management and Budget Circular A-95 (revised 11/13/73). (Section 3C)

(17) Additional archeological and historical information is incorporated in the Final Environmental Statement, correcting deficiencies in the Draft Statement. The Air Force has been particularly alerted concerning the potential vulnerability of some historical sites to damage from sonic booms or noise from low-level flights. The Statement has been revised to reflect these concerns.

The Air Force is also aware of the necessity for protecting the rich archeological resource base in the region. No constructions or equipment installations will be initiated without proper consultation with archeological authorities and investigators. However, detailed archeological investigations will be performed and reported upon for the environmental assessments to be made appropriate to specific TRC construction and equipment installation activities. (Pages 1-52 thru 1-54, 3-41 and 3-57)

(18) As any TRC related population change will occur only at Nellis AFB, sections previously included in the Draft Environmental Statement concerning this subject are no longer included in this Final Environmental Statement. The effects of ordnance testing on water resources has been assumed negligible for the reasons stated in response to (7) above.

(19) The Department of Interior correctly identifies the alternative described as the general classification for which the proposed TRC is a specific implementation.

(20) For the reasons expressed in comment (16) above it is difficult to establish what if any will be unavoidable impacts on wildlife and wild horses. Consequently, it is equally difficult to propose possible mitigative measures for them. However, the Statement has identified the possibility of killing directly, animals occupying areas of live ordnance usage. This possibility applies to wild horses as well, especially those known to graze the North Range. Because the wild horses are highly visible it is possible to readily establish when a herd of horses may be in jeopardy from a particular proposed test activity. Air Force range safety procedures require that the test range be clear to protect people and property from damage. These procedures will be applied to wild horses and other identifiable hazard conditions such that a test will be held up momentarily until the test range is actively cleared or becomes clear of its own accord. The Air Force anticipates no problems in this respect with wild horses.

With regard to recreational values the TRC will regulate its activities to assure that they are compatible to the greatest extent possible with Nevada State recreation plans and policies.

(21) The reference to the commitment of resources that has already occurred is in terms of its irretrievable or irreversible nature. The Air Force has identified in the Statement several areas of significant impact, but in most cases these are not wholly irretrievable, e.g., potential loss of conveniences in use of airspace by private pilots. Similarly, potential impacts on recreational values and on the qualities of solitude and stillness are almost completely reversible in the sense that any losses in these values

are regained if TRC later becomes inactive.

We agree that there may exist possibilities for impacts on wildlife resources, but there is little or no data to suggest that they will occur or how they will occur. This lack of data could be a causative factor in producing an irreversible wildlife loss if nothing further is done to monitor the effects of TRC activities on wildlife. For this reason TRC management will cooperate with Federal, State, and local agencies in efforts to monitor and protect the environment insofar as COR activities are concerned. (Section 7)

(22) The section on unresolved controversies has been revised. The matter of possible TRC conflicts with fire suppression aerial activities of the BLM and US Forest Service have been resolved and treated in more detail in the body of the Statement. We have also noted in this section additional controversies regarding trespass cattle and wildlife disturbances on the Pahranagat National Wildlife Refuge. As there will not be an influx of TRC personnel into small communities in the area, this item is no longer contained in this Statement. (Pages 3-4 thru 3-6 and Seciton 9)

(23) The BLM is correct in that the statement regarding the benefit of restricted ranges to the management of wild horse herds is not accurate. The restricted ranges do tend to prevent poachers and have the potential to provide a non-competive range sanctuary. Elimination of poaching losses to managed wildlife is beneficial to the task of wildlife management but it is only one element. In contrast to this benefit, restricted ranges also pose potential barriers to those charged with management of the wildlife. We understand that a certain degree of freedom of movement of the managers is necessary to properly monitor the herds and inspect the rangelands. To this end the US Air Force, Nellis AFB, has entered into a cooperative agreement with the Nevada State Office of the Bureau of Land Management (BLM) for the purposes of establishing responsibilities and developing a wild horse and burro management plan to enable the BLM to carry out its duties pursuant to the Act of December 15, 1971 (16 USC 133-1340). This Act authorizes the Secretaries of Interior and Agriculture to issue regulations for

the purposes of managing wild free-roaming horses and burros. The US Air Force-BLM agreement was accomplished in February, 1974 and approved by ERDA which also has jurisdiction over some of the lands involved. (Page 8-2)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

1500 N. E. IRVING STREET
P. O. BOX 3737
PORTLAND, OREGON 97208

August 14, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
Office of the Secretary of the Air Force
Washington, D.C. 20330

Dear Dr. Welch:

(1) We have reviewed the draft Environmental Statement for the proposed Continental Operations Range, U. S. Air Force, and have the following comments to offer.

(2) The ES for COR addresses itself primarily to air space. The Air Combat Maneuvering Range (ACMR) is a part of COR. We will submit comments on ACMR at a later date as it does involve specific uses of refuge lands. In our opinion COR will not be detrimental to refuge objectives at Desert or Pahranagat to the degree that we should oppose it. We will probably experience more sonic booms and more low level flights by military aircraft. However, so long as uses of refuge lands continue to be governed by the Memorandum of Understanding between Air Force and Interior, then we can tolerate COR.

Following are comments relating to specific pages of the draft ES.

Page

(3) 1-3 Line 7, after word Management, add: and Fish and Wildlife Service.

(4) 1-6 Paragraph 3, line 10, after word Interior, add: Fish and Wildlife Service, Desert National Wildlife Range, which has primary jurisdiction of the lands in the South Range. Delete: (Desert Game Refuge) which shares the use of the South Range.

(5) 1-12 Paragraph 4, Change entire paragraph to read as follows:

The U. S. Fish and Wildlife Service has primary jurisdiction of lands within Desert National Wildlife Range, including that portion of the Nellis bombing and gunnery range which is within the western half of the Wildlife Range. Air Force activities within Desert National Wildlife Range are governed by a Memorandum of Understanding signed by the Secretary of the Air Force and the Secretary of the Interior. Part of Desert National Wildlife Range has been proposed for Wilderness designation pursuant to the National Wilderness Act. An ES was prepared for this proposed action, and Air Force use of the Refuge is addressed there.

(6) 1-24 Paragraph 1, after Bureau of Land Management, add: and U. S. Fish and Wildlife Service.

(7) 2-7 Paragraph 2, replace the word wasteland with land.

(8) 2-18 The Memorandum of Understanding between Interior and Air Force stipulates that "...all military planes flying over the Desert National Wildlife Range shall observe an air space reservation and shall maintain a minimum altitude of at least 1,500 feet above ground level, except when landing and taking off at Indian Springs Base and when using the approach corridor in townships 16 and 17 south, ranges 57,58 and 59 east or when using the air-to-ground targets, and when flying low level combat profile operations on the targets covered in this agreement." Low Level Route #332 should not be flown over Desert National Wildlife Range, nor should any other low level flights be conducted over Desert NWR except as permitted in the Memorandum of Understanding. Further, low level flights should not be conducted over Pahranagat National Wildlife Refuge

(9) 2-63 Last paragraph, Bureau of Sport Fisheries and Wildlife should be replaced by U. S. Fish and Wildlife Service.

(10) 2-110 There are many archeological sites on Desert National Wildlife Range and Pahranagat National Wildlife Refuge.

(11) 2-144 Paragraph 2, line 3, after words Management Areas, add: and Pahranagat National Wildlife Refuge.

(12) 4-31 Neither low level flight nor sonic booms should be permitted over Pahranagat National Wildlife Refuge. There are regulations regarding this, but compliance must be a result of proper pilot indoctrination at Nellis. We have not been successful in stopping low level flights by military jet aircraft over Pahranagat even though we have made numerous reports and complaints to Nellis officials.

(13) 5-17 Paragraph 1, add: Pahranagat National Wildlife Refuge after Kirch WMA.

(14) 6-4 On Desert National Wildlife Range better policing measures should be initiated and carried out to reduce the amount of spent ordnance rather than permit a greater accumulation in future years.

(15) C-4 We know that captive desert bighorn ewes commonly breed as yearlings and give birth to their first lambs at age two. Life expectancy for desert bighorns is not approximately 15 years for the great majority of animals. In our opinion, "Average age at death" in a wild population is closer to 10 years than 15.

(16) G-5 Paragraph d. According to COR personnel at Nellis Air Force Base this paragraph addresses itself only to air space. However we must make it perfectly clear to all parties that primary jurisdiction of all refuge lands within Range 4806 will remain with the Fish and Wildlife Service, and that the Memorandum of Understanding between Interior and Air Force is still binding regarding specific uses of refuge lands by Air Force and the Fish and Wildlife Service.

17) When referring to this refuge, Desert National Wildlife Range should be used throughout the draft ES to eliminate confusion and for the sake of consistency. Desert Game Range, Desert Game Refuge, etc. are not proper.

Sincerely yours,

R. Kahler Martinson

R. Kahler Martinson

Regional Director

Responses to Department of Interior, Fish and Wildlike Service Comments

(1) The Air Force is grateful for the review performed by the Fish and Wildlife Service. Their comments have aided materially in improving the accuracy of the Environmental Statement.

(2) The Statement now addresses the Air Combat Maneuvering Instrumentation (ACMI) location in relation to the Desert National Wildlife Range and the use of this area and the associated impact therefrom. (Pages 1-8 and 3-24)

(3) and (6) The Fish and Wildlife Service has been added to the list of agencies which will be required to make supplementary decisions in accord with their responsibilities to manage resources under their jurisdictions.

(4) and (5) The Statement has been corrected to accurately reflect the proper administrative authority of the Fish and Wildlife Service concerning the lands of the Desert National Wildlife Range.

(7) The Air Force apologizes for the derogatory connotation in the use of the word "wasteland." It was not intended and the word has been stricken.

(8) According to the DOD FLIP charts, low-level route 332 is initiated on a northerly path which passes just outside the eastern boundary of the Desert National Wildlife Range but over the Pahranagat National Wildlife Refuge and then eventually terminates at a target area in the notherly half of the Nellis RAnge. The terminal leg of the route is therefore constrained to observe the terms stipulated in the

Memorandum of Understanding between the Department of Interior and the Air Force.

Since low-level route 332 passes over the Pahranagat National Wildlife Refuge and in view of the comment in (12) of the Fish and Wildlife Service letter, the problem associated with low-level flights there is included as one of the unresolved controversies (Section 9)

(9) The Statement has been corrected to show Fish and Wildlife Service as the proper administrative authority for the wildlife refuges.

(10) The Statement has been revised with respect to information on archeological and historical resources. (Page 1-52)

(11) Pahranagat National Wildlife Reguge has been added to the list of waterfowl hunting areas. (Page 1-92)

(12) As noted in response number (8) above, this problem is cited as one of the unresolved controversies.

(13) As the proposed COR area has since been reduced in scepe so that it no longer includes the Hill/Wendover/Dugway area, this Statement does no longer address this area.

(14) Although it is clearly desirable to remove as much of the spent ordnance remains as possible, such efforts should be guided by practical considerations. Such considerations include the effectiveness of more concerted efforts and the cost of those efforts. The Air Force will do its utmost to improve the effectiveness of range policing. (Section 5B)

(15) We acknowledge the fact that some desert bighorn ewes breed as yearlings and give birth in their second year. However, in our analysis of the available data we assumed these contributions to total reproduction to be relatively insignificant. A more accurate life-death table in this respect would not alter our conclusions regarding the population dynamics for this species.

We are thankful for the correction regarding our misuse of the term "life expectancy." Fifteen to sixteen years is more correctly stated as the maximum life span as Table C.1 indicates. The table also agrees well with the estimate of roughly 10 years as the average age at death. (Appendix C)

(16) The COR airspace described in appendix G deals primarily with the dimensions of the airspace required for use by the Air Force; the TRC activities proposed to be undertaken within that airspace are still bound to observe the constraints agreed to in the Memorandum of Understanding.

(17) The Air Force apologizes for any confusion that may have been induced by inaccurate references to the Desert National Wildlife Range. We have sought to correct all such references appearing in the Statement.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WESTERN REGION
P O BOX [illegible], WORLDWAY POSTAL CENTER
LOS ANGELES, CALIFORNIA [illegible]

August 7, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
Office of the Assistant Secretary (SAF/ILE)
Department of the Air Force
Washington, DC 20330

Dear Dr. Welch:

(1) As requested, we have now completed a review of your draft Environmental Impact Statement for the proposed "Continental Operations Range" dated June 1974.

Our findings indicate that this proposed project will not present any problem from an environmental viewpoint to any existing or presently planned FAA facilities.

We appreciate the courtesy extended in bringing this matter to our attention.

Sincerely,

W. BRUCE CHAMBERS
Regional Planning Officer

cc: AEQ-1

Responses to Department of Transportation, Federal Aviation Administration Comments

(1) The Air Force is grateful for the review of the Draft Environmental Statement performed by the Federal Aviation Administration.

STATE OF NEVADA
OFFICE OF THE STATE PLANNING COORDINATOR
CAPITOL COMPLEX
CARSON CITY, NEVADA 89701
(702) [illegible]

September 10, 1974

Dr. Billy E. Welch
Special Assistant
for Environmental Quality
SAF-ILE
Washington D. C. 20330

RE: COR (Continental Operating Range)

Dear Dr. Welch:

I wish to take this opportunity to express my thanks for your efforts in seeing that the concerns of the State of Nevada regarding the above referenced proposal were addressed. As a result of a conference held with representatives of the Air Force on August 26, 1974, the following actions were taken in relation to the draft environmental statement and the related rule-making discussed in the environmental statement.

(2) 1. Possible interference with communication networks that exist or are proposed:

(a) The state is proposing to submit application to the FCC for an instructional television network. It was feared that the frequencies to be used by the Air Force would interfere with this proposal, or if used by the Air Force prior to the submission of the state's application, the state would be precluded from using such frequencies.

It was agreed that the state would provide information on this network to the Air Force so that it could be analyzed for the final environmental statement: It was further agreed that should the Air Force utilize similar frequencies that when the state system begins operation the Air Force equipment would be tuned so as not to interfere with the state system, or if this was not possible that the Air Force would relinquish use of those affected frequencies.

(b) Concern that the electronic warfare equipment was of a barrage type which could possibly interfere with many communication networks in the state.

It was indicated that the equipment to be used is of a selective nature and can be tuned so that it will not interfere with any equipment in the state. This point should be indicated in the environmental statement, as well as information that the Air Force will make whatever frequency adjustments are necessary if interference does occur.

(c) It was requested that the Air Force attempt to avoid utilizing any space in the 140-170 MHz frequency band.

The Air Force indicated that they probably would have to use one frequency in this band no wider than 5 MHz but in the event of any interference, necessary adjustments would be made or the frequency abandoned by the Air Force.

The Air Force agreed to provide a phone number for direct contact with the responsible officer should any radio interferences occur.

3) 2. Economic impacts upon communities where COR related growth is anticipated. Specific emphasis has been placed on the impact upon community facilities which might become overloaded, thus requiring expansion, e.g. schools, sewer and water facilities, plus housing.

(a) It was agreed that the statement on page 1-9 referring to "... a few thousand people" should be modified to indicate community populations since the existing language implies a smaller population density than actually exists.

(b) It was agreed that influx of population into small rural communities because of COR would exert severe economic impacts upon such communities. Because the type and number of personnel to be located in any community cannot be identified at this point, it is understood that environmental statements for specific site development would be submitted as separate reports when such developments were to take place. It was pointed out that because of the economic taxing situation in Nevada, it might be impossible for communities economically to absorb various economic impact costs that would not be covered under P.L.874.

(c) There was concern that the environmental statement indicated a sufficient supply of available houses in Tonopah. State figures do not indicate this to be the case and additional analyses would have to be made of this matter, especially in light of the fact that the Air Force is currently selling Air Force housing that exists in the community.

(4) 3. Restrictions of air space - additional restrictions and controls being placed on private utilization of currently unrestricted air space within the COR area.

(a) There was a great deal of concern related to the temporary air space restriction proposed for Area R-48XX and the proposal that the Air Force would be the agency responsible for requesting termination of the temporary restriction.

It was agreed that the proposal would include language that the temporary restriction would be requested for a limited period of time, after which the restriction would be lifted or at least reviewed as to any need for further extension of the time period. Lifting of this temporary restriction will not be a contingent upon Air Force initiation or approval.

(b) It was stated that the State of Nevada must have access into areas at certain specified times which are generally known some days in advance. This type of activity would include such work as inventorying of game and waterfowl species, etc. In addition, the state felt it absolutely necessary that uncontrolled access be allowed for emergency services, such as fire fighting, accident control or humanitarian reasons The Air Force indicated that all activities of this nature can be accommodated within the proposal and they would structure their training activities around the state's activities once such information is provided to them. The scheduling of all planned aerial surveys to be conducted by State Fish and Game during 1974-75 is attached as well as maps of Nevada to indicate location of flights. These aerial surveys are conducted at low altitude, usually about 200 feet above the ground. The duration of the flights are variable depending upon how thorough an area is to be surveyed.

(c) Airways Engineering Corporation, a corporation presently conducting an airport systems study in the State of Nevada, requested, and the Air Force agreed to provide, written justification from FAA as to how the decision was made as stated on page 3-13: "... It is the opinion of ATC personnel that the projected increases in traffic at Nellis (because of COR far-term plans) would not require changes in the letter of agreement between Nellis and McCarran for McCarran air traffic activity in the mid-1980's. On the other hand, certain ATC problems which cannot be foreseen at this time, may develop from time to time as a result of increases in air traffic activity. Situations such as these are handled on an individual basis, and generally involve only procedural adjustments."

Currently, it was learned that, there exists non-compatible radar at McCarran International Airport and Nellis. With the increased traffic

at McCarran, as well as larger aircraft being utilized, it was felt that the opportunity for accidents was greatly increased. This might require a change in the letter of agreement between the Nellis and McCarran ATC towers.

(d) Airways Engineering Corporation requested additional clarifying language defining the supersonic flyways to be included in the final draft statement. The Air Force agreed to include such a breakdown.

(e) It was agreed that the term "joint use" was not an adequate description of the air-space availability in COR North, COR East and R-48XX and that therefore new descriptive language would be required to define how the COR areas would be controlled but not restricted. The Air Force agreed to review the language to be used in the Notice of Proposed Rule Making covering this point and ensure that such language in fact allowed the type of COR airspace usage related by the Air Force in its public hearings held in Reno and Las Vegas, Nevada.

(f) Several agencies expressed concern about the hazards related to subsonic and supersonic training activities. The Air Force indicated that all supersonic activity is to be conducted above normal flight paths in the state except in currently restricted areas. The Air Force will provide a letter to the airport systems' consultant to the Nevada Public Service Commission (Airways Engineering Corporation of Reno) stating the above point and include this letter in the final environmental statement.

(g) The Air Force agreed to change the word "denied" in paragraph 2.3.3.3. on page 2-49 to a term which would clearly indicate that restrictions were not to be placed on utilization of air space in COR North and COR East but rather that passage through the area would be controlled only to the minimum amount necessary to provide adequate separation military and non-military aircraft for safety purposes.

(5) 4. Representatives of the State Parks System expressed concern over communication problems as had other agencies, but felt that if the state communication agencies were satisfied that the State Parks System's concern would be handled also.

(6) The other major concern of the State Parks System related to Historic sites and fragile rock formations within State Park areas and the damage that might be caused to old structures, etc., by low-level training flights, as well as supersonic flights. They felt that because of the fragile nature of some of the rock formations, buildings and building sites in existing state parks, supersonic activity could conceivably cause damage to these sites.

The Air Force indicated that they did not have a complete inventory of such historic sites and parks and would include such in the environmental statement if the Parks System would provide it and note which of these may be susceptible to sonic booms. The Parks Division is preparing the inventory and will submit it shortly.

The Air Force indicated that their low-level routes could be developed to avoid such areas.

(7) 5. The Bureau of Environmental Health raised the question concerning the aircraft emissions standards used in the environmental statement. Apparently the standards utilized in the environmental statement are figures developed by the Air Force and do not comply with EPA emission standards. It was requested that the Air Force contact the Environmental Protection Agency concerning whether the standards utilized are acceptable to EPA. A copy of EPA's response is to be provided to the State of Nevada and is to be included in the final environmental statement.

Because the aircraft emissions form such a high percentage of hydrocarbons in the Las Vegas area, if the Air Force figures are not acceptable to EPA, this would require a revision of the state air quality implementation plan. It was stressed that under no circumstances would the state accept a proposal on the part of the Air Force that would require other parties to modify their current air quality plans, e.g. highway plans, in order to allow increased military aircraft activity. Any improvements necessary to offset increased aircraft emissions would be entirely an Air Force obligation to correct through such mitigating procedures as improved engines, increased flight activities only at time when air inversions do not exist, and other means.

It is my understanding that the agreements and assurances discussed will be agreed to in writing by the responsible Air Force authority, and that this letter as well as copies of the written Air Force responses will be included in the final environmental statement and/or rule making or both as appropriate.

Sincerely yours,

John Wm. Sparbel

John Wm. Sparbel
Administrative Officer
Program Coordinator

JWS:bw

(1) The Air Force is grateful for the review performed by the several administrative departments of the State of Nevada. We are particularly appreciative of the additional information that has been supplied to aid in the task of completing the Environmental Statement.

(2) The Air Force on a continuing basis requests the Electromagnetic Compatibility Analysis Center (ECAC) to analyze the impact of the additional electromagnetic spectrum usage introduced by the TRC operations in the non-participating environment. The results of these analyses identify interaction problems which then are specifically addressed by the Air Force. Interaction parameter criteria levels of 10 dB below the receiver noise level is being used as a conservation estimate for a level of potential interference, and the participant source/non-participant pair is identified as interference susceptible candidates when the above level is exceeded. Thus far in analyses which specifically addressed State of Nevada communication systems, several problems were identified and resolved by changing the TRC equipment geographical location, and restructuring operation frequency ranges. (Sections 3B and 5C)

(2-a) Once data is provided on the proposed state operated educational TV system, this data will be incorporated into the analysis described above.

(2-b) Barrage type Electronic Warfare jammer equipment has been adopted in the past for training and operational tests by either selecting an appropriate operations time and/or incorporating band filters into the equipment. TRC operations will take the same approach using this type of equipment in an operation.

(2-c) Proposed utilization of a frequency in the 140-170 MHz band by the Air Force would be accomplished on a non-interference basis as determined by ECAC analysis and by cooperative tests between the Air Force, State of Nevada and other non-participant users. If Air Force usage of all frequencies in the above band are found to cause interference with non-participants, coordinated usage of the frequency would be investigated on a case-by-case basis by the Air Force.

The responsible officer to notify in case of any radio frequency interference (RFI) would be:

Capt Chester D. Smith
Spectrum Management & Control Office
Nellis AFB
Nevada 89191

Telephone: (702) 643-2945

(3) Under present plans there will no longer be an influx of TRC personnel into small rural communities in the area. Increases of personnel will occur at Nellis AFB. Therefore, this area and the resulting support are no longer addressed in this Statement.

(4-a) The proposed restricted area designated as R-48XX in the Draft Statement has been deleted. The airspace has been combined with one or both of the special rules areas. The actual wording contained in these proposed rule making notices is contained in Annex G, Page 7. (Pages 1-27 and G-7)

(4-b) In addition to the State of Nevada the BLM and the US Forest Service have commented on the requirements for routine as well as emergency uses of airspace in the TRC region for such duties as wildlife management and control and forest fire reconnaissance and control. The Air Force is grateful for the detailed information it has received on these operations. The information has been carefully considered and the Environmental Statement has been revised to reflect these considerations. (Pages 3-4 through 3-7)

(4-c) The referenced paragraph was intended primarily for information only and does not represent any decision making process by the Air Force as part of the TRC proposal. Accordingly, the Air Force is merely acknowledging that it is a party to Letters of Agreement through which two or more parties formally and clearly delineate their responsibilities in the interest of safe air traffic flow. In the case of the Las Vegas area, TRC aircraft are totally indistinguishable from any other military aircraft arriving and departing Nellis AFB. A projected increase in Nellis AFB traffic would not necessarily alter an Agreement.

However, it should be noted that since publication of the Draft Environmental Statement, the FAA has announced that a Terminal Control Area (TCA) will be implemented at Las Vegas. Although this is a major rule making action, it has no direct bearing on TRC nor will TRC have any impact on the TCA.

The Air Force wishes to correct any misunderstanding regarding radar compatibility between Nellis AFB and McCarran International Airport. The FHA radar at McCarran is compatible with Air Force operations and those operations are compatible with the radar. The entire TRC air traffic control program was designed to be compatible with FAA automated radar terminal systems (ARTS III) and the National Airspace System (NAS). An increase in traffic would have no bearing on compatibility of equipment.

(4-d) Aircraft at Nellis utilized a high altitude supersonic corridor for functional flight checks. It began at the southern edge of and passed through the airspace area now included in the airspace training areas (ATCAAAs). As indicated in this Statement, supersonic operations can be conducted down to 5,000 feet above ground level throughout the ATCAAAs. The corridor exited the ATCAAAs at their northern edge above 30,000 feet. There are no limitations on supersonic operations above 30,00 feet. (Page 1-9)

(4-e) Differentiation of the terms "joint use" and "shared use" are addressed on pages 2-9 and 2-10 of this Final Environmental Statement.

(4-f) As indicated in this Final Environmental Statement, supersonic flight operations can be conducted down to 5,000 feet above ground level in the airspace training areas (ATCAAAs), as well as supersonic operations within the restricted airspace areas. (Pages 1-5 through 1-9)

(4-g) The term "denied", used in reference to air traffic control has been deleted. The description of the airspace proposal has been changed to more accurately reflect the nature of airspace use. (Sections 1C and 2D)

(5) The State Park communications system can be analyzed by ECAC if a problem exists. The primary susceptible candidates of this network are the communications repeater systems used by other agencies which have been included in the susceptibility analyses. (See response (2) above)

(6) The Air Force is grateful to the Nevada State Parks System for providing information on important historical sites. This information has been incorporated in the Statement along with analyses of potential impact. Although no apparent hazards to historical sites are posed by TRC operations, the information will be most useful in all future planning. (Pages 1-52, 3-41 and 3-57)

(7) The questions raised by the Nevada State Bureau of Environmental Health concerning aircraft emissions has been the basis for a significant revision to the analysis of air quality impacts. As pointed out in the Statement, the emissions standards used by the Air Force are those resulting from their own investigations. The Air Force standards are different from those published by the EPA. The Air Force investigations in this respect are an attempt to refine emission standards for military aircraft so

that emission factors appropriate to each specific military aircraft engine will be available. To this end they have sent their data to EPA with the recommendation that they be formally adopted. It is the Air Force's understanding that the EPA has taken these recommendations under advisement. The most recent data on aircraft engines emission factors and mode-and-time for aircraft operations at Nellis AFB have been used in this Final Statement for calculation of air pollutant emission.

The data used in the calculations are much more specific, detailed and current than the data used in making the 1970 estimated emissions. (Pages 3-46 and 3-47)

The impact of calculated military aircraft emissions on the State Air Quality Implementation Plan (SIP) are presented and analyzed in Section 3D. As indicated therein, the calculated military aircraft hydrocarbon emissions during 1975 were less than one-third of the projected allowable emissions indicated in the SIP. Also, the calculated military aircraft carbon monoxide emissions were less than one-half of the projected allowable emission contained in the SIP for 1975. This section also describes Air Force efforts underway to reduce emissions from military aircraft.

: O'CALLAGHAN
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EVADA
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'C R. CRONKHITE
ninistrator

OM 221
: BUILDING
S. FALL STREET
RSON CITY
VADA 89701
!/882-7339

July 30, 1974

Billy E. Welch, Ph.D
Special Assistant for Environmental
Quality
Department of the Air Force
Washington, D. C. 20330

Dear Dr. Welch:

(1) Thank you for the opportunity to review the draft environmental statement for the proposed Continental Operations Range.

If, as the statement indicates, the implementation of the proposed COR will not require the closure of additional lands to outdoor recreation uses, nor will new areas be used for supersonic and bombing operations, we find no conflict with present or planned operations of the Nevada State Park System within the area affected by the proposal.

Sincerely,

Eric Cronkhite per

Eric R. Cronkhite
Administrator

ERC:lk

Response to Nevada State Park System Comments

(1) The Air Force is grateful for the review performed by the Nevada State Park System. TRC operations will not require the closure of additional lands to outdoor recreational uses. Bombing operations and changes in supersonic activities will be constrained to the existing restricted airspace areas of the TRC. As indicated in the Statement, consultation between the Air Force and state planners regarding plans for recreational developments are necessary to avoid incompatibilities between TRC operations and recreation uses. (Page 2-8)

MIKE O'CALLAGHAN
Governor

THOMAS N. LAYTON, PH.D.
Director

The Nevada State Museum

CARSON CITY, NEVADA 89701

Telephone (702) 882-7348

August 14, 1974

Dept. of the Air Force
Hdqtrs. U.S. Air Force
Washington D.C. 20330

Dear Col. Bell:

(1) I have read your draft environmental statement on the proposed Continental Operations Range in the Great Basin of the United States. The Nevada State Museum has a particular concern about archaeological and historical values within the proposed COR, and is so charged with that resposibility by State law.

(2) Since most of the existing bombing and gunnery ranges have been closed to the public since World War II, we do not have current data on site locations within these federal preserves. This does not mean that these areas are devoid of such values, however, and if a systematic survey were to be carried out, I would expect that quite a few new sites would be discovered. While it would be desirable to inventory such resources on these preserves, this would be difficult to do because of the continuous use made of these facilities. Where we have had access to such a range, Indian Springs, we have located quite a few unique and unusual prehistoric sites.

(3) With reference to the proposed COR, there is some newly passed federal legislation which would affect the emplacement of any type of facility on public lands. It is P.L. 93-291, and a copy is enclosed for your perusal. I am also enclosing a booklet recently published by the Society for American Archaeology, and a copy of Nevada's Antiquity Act. The usual procedure for "mitigating the impact" of new construction upon archaeological values is to have the federal agency involved contract with the Arizona Archaeological Center to do so. Their address is P.O. Box 49008, Tucson, Arizona 85717.

Sincerely yours,

Donald R. Tuohy

Donald R. Tuohy
Curator of Anthropology

May 29, 1974

The Archeological Conservation bill (the Moss-Bennett bill) was signed into law by the President on May 24, 1974. It is now P.L. 93-291.

Hester A. Davis

S.514 AND H.R. 296 AS THEY HAVE BEEN REWRITTEN BY THE HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

A BILL

To amend the Act of June 27, 1960 (74 Stat. 220), relating to the preservation of historical and archeological data.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to provide for the preservation of historical and archeological data (including relics and specimens) which might otherwise be lost as the result of the construction of a dam", approved June 27, 1960 (74 Stat. 220), is amended to read as follows: "That it is the purpose of this Act to further the policy set forth in the Act entitled 'An Act to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes', approved August 21, 1935 (16 U.S.C. 461-467), by specifically providing for the preservation of historical, and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of the terrain caused by the construction of a dam by any agency of the United States, or by any private person or corporation holding a license issued by any such agency or (2) any alteration of the terrain caused as a result of any Federal construction project or federally licensed project, activity or program.

"Sec. 2. Before any agency of the United States shall undertake the construction of a dam, or issue a license to any private individual or corporation for the construction of a dam it shall give written notice to the Secretary of the Interior (hereafter referred to as the "Secretary") setting forth the site

of the proposed dam and the approximate area to be flooded and otherwise changed if such construction is undertaken: Provided, That with respect to any floodwater retarding dam which provides less than five thousand acre-feet of detention capacity and with respect to any other type of dam which creates a reservoir of less than forty surface acres the provisions of this section shall apply only when the constructing agency, in its preliminary surveys, finds, or is presented with evidence that historical, or archeological materials exist or may be present in the proposed reservoir area.

"Sec. 3. (a) Whenever any Federal agency finds, or is notified, in writing, by an appropriate historical or archeological authority, that its activities in connection with any Federal construction project, or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data, such agency shall notify the Secretary, in writing, and shall provide the Secretary with appropriate information concerning the project, program, or activity. Such agency may request the Secretary to undertake the recovery, protection, and preservation of such data (including preliminary survey, or other investigation as needed, and analysis and publication of the reports resulting from such investigation), or it may, with funds appropriated for such project, program, or activity, undertake such activities. Copies of reports of any investigations made pursuant to this section shall be submitted to the Secretary, who shall make them available to the public for inspection and review.

"(b) Whenever any Federal agency provides financial assistance by loan, grant, or otherwise to any private person, association, or public entity, the Secretary, if he determines that significant scientific, prehistorical, historical, or archeological data might be irrevocably lost or destroyed, may with funds appropriated expressly for this purpose conduct, with the

consent of all persons, associations or public entities having a legal interest in the property involved, a survey of the affected site and undertake the recovery, protection and preservation of such data (including analysis and publication). The Secretary shall, unless otherwise mutually agreed to in writing, compensate any person, association or public entity damaged as a result of delays in construction or as a result of the temporary loss of the use of private or any non-federally owned lands.

"Sec. 4. (a) The Secretary, upon notification, in writing, by any Federal or State agency or appropriate historical or archeological authority that scientific, prehistorical, historical, or archeological data is being or may be irrevocably lost or destroyed by any Federal or federally assisted or licensed project, activity, or program, shall, if he determines that such data is significant and is being or may be irrevocably lost or destroyed and after reasonable notice to the agency responsible for funding or licensing such project, activity, or program, conduct or cause to be conducted a survey and other investigation of the areas which are or may be affected and recover and preserve such data (including analysis and publication) which, in his opinion, are not being, but should be, recovered and preserved in the public interest.

"(b) No survey or recovery work shall be required pursuant to this section which, in the determination of the head of the responsible agency, would impede Federal or federally assisted projects or activities undertaken in connection with any emergency, including projects or activities undertaken in anticipation of, or as a result of, a natural disaster.

"(c) The Secretary shall initiate the survey or recovery effort within sixty days after notification to him pursuant to subsection (a) of this section or within such time as may be agreed upon with the head of the agency responsible for funding or licensing the project, activity or program in all other cases.

"(d) The Secretary shall, unless otherwise mutually agreed to in writing, compensate any person, association, or public entity damaged as a result of delays in construction or as a result of the temporary loss of the use of private or non-federally owned lands.

"Sec. 5. (a) The Secretary shall keep the agency responsible for funding or licensing the project notified at all times of the progress of any survey made under this Act, or of any work undertaken as a result of such survey, in order that there will be as little disruption or delay as possible in the carrying out of the functions of such agency and the survey and recovery programs shall terminate at a time mutually agreed upon by the Secretary and the head of such agency unless extended by mutual agreement.

"(b) The Secretary shall consult with any interested Federal and State agencies, educational and scientific organizations, and private institutions and qualified individuals, with a view to determining the ownership of and the most appropriate repository for any relics and specimens recovered as a result of any work performed as provided for in this section.

"(c) The Secretary shall coordinate all Federal Survey and recovery activities authorized under this Act and shall submit an annual report at the end of each fiscal year to the Interior and Insular Affairs Committees of the United States Congress indicating the scope and effectiveness of the program, the specific projects surveyed and the results produced, and the costs incurred by the Federal Government as a result thereof.

"Sec. 6. In the administration of this Act, the Secretary may--

"(1) enter into contracts or make cooperative agreements with any Federal or State agency, any educational or scientific organization, or any institution, corporation, association, or qualified individual; and

"(2) obtain the services of experts and consultants or organizations thereof in accordance with section 3109 of title 5, United States Code; and

"(3) accept and utilize funds made available for salvage archeological purposes by any private person or corporation or transferred to him by any Federal agency.

"Sec. 7. (a) To carry out the purposes of this Act, any Federal agency responsible for a construction project may assist the Secretary and/or it may transfer to him such funds as may be agreed upon, but not more than one per centum of the total amount authorized to be appropriated for such project, except that the one per centum limitation of this section shall not apply in the event that the project involves $50,000 or less.

"(b) For the purposes of subsection 3(b), there are authorized to be appropriated such sums as may be necessary, but not more than $500,000 in fiscal year 1974; $1,000,000 in fiscal year 1975; $1,500,000 in fiscal year 1976; $1,500,000 in fiscal year 1977; and $1,500,000 in fiscal year 1978.

"(c) For the purposes of subsection 4(a) there are authorized to be appropriated such sums as may be necessary, but not more than $2,000,000 in fiscal year 1974; $2,000,000 in fiscal year 1975; $3,000,000 in fiscal year 1976; $3,000,000 in fiscal year 1977; and $3,000,000 in fiscal year 1978."

Response to Nevada State Museum Comments

(1) The Air Force is grateful to the Nevada State Museum for their review of the COR Draft Environmental Statement.

(2) This Statement includes discussion of the possibility of historical and archaeological sites within the TRC restricted land areas, and actions which would be taken to prevent loss of these values. (Pages 1-52 and 3-57)

ANNEX B

OTHER WRITTEN COMMENTS ON THE
DRAFT ENVIRONMENTAL STATEMENT
AND AIR FORCE RESPONSES

Written comments were also received from several individuals and private organizations. Each letter received is reproduced, followed by a corresponding set of responses in the same format as presented in Annex A.

1885 South Jackson Street
Denver, Colorado 80210
September 8, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
SAF/ILE
Washington, D. C. 20330

Dear Sir:

(1) Please include this letter in the official record of comments on the Draft Environmental Statement for Proposed Continental Operations Range, United States Air Force, June 1974. Thank you.

I am familar with the region involved in the proposed COR, having driven the main highways in the area and hiked in the Desert National Wildlife Range and the Monitor, Toquima, Toiyabe, White Pine, and Snake Ranges. I believe Nevada's wide open spaces are far from being "wastelands," rather they contain uncommon resources such as vastness, stillness, and solitude, as mentioned on page 2-65, and are important for wildlife habitat, grazing, recreation, mining, and wilderness preservation.

In reading the Draft ES, I was impressed at the amount of work that had gone into its preparation. However, I would like to point out the totally incomplete and inadequate coverage of a vital resource on the federal lands beneath the proposed COR. This is the finite, irreplaceable wilderness resource.

The Desert National Wildlife Range, mandated for study under the Wilderness Act of 1964, is mentioned under "Plans for Proposed Wilderness" in the Draft Statement. But de facto wilderness lands abound in the COR region and are an important component of the present environment. This fact makes the area both suitable for a COR and of interest to those people who feel the need for an enduring resource of wilderness.

These de facto wilderness lands near COR include those found in the U. S. Forest Service's 1971 Roadless Undeveloped Area Inventory (226,000 acres in the Quinn Division, which contains Troy Peak, and areas in the Toiyabe, Toquima, Monitor, Schell Creek, and Snake Ranges) and areas identified as having primitive values by the Bureau of Land Management (such as the South Pahroc Range, Pahranagat Range, Gleason Canyon, Meadow Valley Mountains, Mormon Mountains, Arrow Canyon Range, Muddy Mountains, Seaman Range, Park Range, Morey Peak, and the Deep Creek Mountains in Utah). In addition, many of the other mountain ranges on BLM land, such as the Worthington Mountains with their Leviathian Cave Geological Area, have roadless tracts which should be given consideration as de facto wilderness both in the Draft ES and in subsequent Air Force planning.

Members of the Sierra Club participated in a wilderness study of the Grant and Quinn Canyon Ranges in June, 1971. Their report contains the following observations:

> Because of remoteness and difficult access, the Grant and Quinn Canyon Ranges have retained more wilderness character than many other mountains in Nevada.

The true crest area of both ranges, though only a few miles wide, is so rugged that much of it remains pristine.

Considering the desert surroundings of the Grant and Quinn Canyon Ranges, the flora is remarkably rich. There are more than a dozen common tree species, and the density of the forest cover is surpassed only in the Sierra Nevada, the Jarbidge Mountains, and the Snake Range among the state's mountains. There are more than 250 species of wildflowers including forbs, bushes, and cacti. The floral variety is apparently a result of (1) the relatively moist climate, and (2) the ruggedness and remoteness of the high country, which has helped to minimize overgrazing.

The most critical species from the standpoint of wildlife management is the desert bighorn sheep, which inhabits the highest mountain ridges in summer and retreats to rugged areas of lower slopes and sheltered canyons in winter. . . . there appear to be three herds including one on Troy Peak, one in the Quinn Canyon Range, and a third on Blue Eagle Mountain. Although the Troy Peak herd appears to be the largest of the three, its population declined from an estimate of more than 200 in 1959 to a present estimate of 50 to 100 animals (possibly fewer), just barely adequate to maintain its existence.

Remoteness and inaccessibility have helped to keep much of the Grant and Quinn Canyon Ranges in an unspoiled condition as a de facto wilderness. Limestone outcrops, rugged canyons, bristlecone pines, luxuriant fir and pinyon pine forests, wildflowers, and bighorn sheep are among the natural assets which qualify the region as one of the best potential wilderness areas in the Great Basin.

(2) Any development in these two ranges would have significant, long-term, and destructive impact. Location of microwave repeaters in Forest Service or BLM lands should be planned with conservationists at the earliest possible date. The plans for a microwave repeater site in the Quinn Canyon Range should be stated more clearly, not vaguely hinted at. Is this in the plans or not? In Figure 2.9, page 2-38, the line drawn towards Troy Peak for a communication link with no symbol at the end is not clear.

(3) Microwave repeater site development, road construction, and low-level flights could have a great impact on the area's de facto wilderness resource. Penetration of the nation's shrinking wilderness resource should be added as number nine on page 4-44 under Impact of Ground Activities. Sections 7, 8, and possibly 9 should also mention the de facto wilderness resource.

(4) I believe a project of this magnitude should allow for study of native species and archeological sites as part of the cost of the project. As on the wilderness resource, impacts are likely to be great.

To those in the Air Force who worked on the location of the COR, the spread of human developments over the American land should be clear. For all our people, there is just not too much wilderness left. We must carefully consider its use

Sincerely,

Amy Mazza-Scholl

Responses to Comments by Amy Mazza-Scholl

(1) The Air Force is grateful to Ms. Mazza-Scholl for calling to our attention the wilderness values distributed throughout much of the TRC region. The Draft Statement was deficient in not fully acknowledging the extent of these values and we have therefore included much of the information in your letter in the revisions to the Statement. The reference to "wastelands" was inadvertent and there was no intent to derogate the wilderness values of the region.

Ms. Mazza-Scholl correctly observes that one of the features that makes the Nevada region suitable for TRC operations is also essential to the existence of wilderness values. The very small land parcels required for siting the proposed TRC communications equipments should be accommodated with no impact on wilderness values. Through careful planning the Air Force also believes that its air activities as part of TRC can be carried out without detracting from the wilderness values as well . (Sections 1D, 2A, 2B, 2C, 3E, 5D and 8)

(2) The Draft Statement has been revised to specifically note the designation of the Quinn Canyon Range as a roadless inventoried area. The Air Force will prepare individual assessments for any sites proposed for installation of microwave repeaters. (Sections 2A and 3E)

(3) Resource values associated with de facto wilderness areas have been noted in several places throughout the Statement. (Sections 1D, 2A, 2B, 2C, 3E)

(4) The information provided in the Statement concerning the enumeration and distribution of species is comprehensive and portrays their

significance. The Statement acknowledges that there is a limited body of information upon which to assess impacts to the natural environment. The Air Force is prepared to assist the efforts of those charged with performing environmental research and investigations related to possible effects from TRC operations.

Additional information has been provided on archeological and historical values in the Statement. (Sections 1D, 3C, 3E, 5B, 5D and Appendices A through D.

4224 Chiltern Circle
Las Vegas, Nevada 891[illegible]
August 23, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
SAF/ILE
Washington D.C. 20330

Dear Sir:

(1) In reading the draft ES for the proposed [illegible] in the Nevada-Utah region, I found very little mention of the Desert Game Range which lies just northwest of Las Vegas. Also the map on page 2-38 shows [illegible] emplacements, [illegible] or threat simulator sites in the area. Therefore I assume that except for a small increase in number of flights over the area, there will be no change in Air Force use of the area. If it is later decided that facilities are needed in the area, I further assume that installation will be preceded by appropriate studies and notification.

BEST AVAILABLE COPY

Sincerely,
[illegible signature]
Chairman, Las Vegas Group
Toiyabe Chapter, Sierra Club

AN-B-6

4224 Chatham Circle #2
Las Vegas, Nevada 89109
August 23, 1974

Dr. Billy E. Welch
Special Assistant for Environmental Quality
SAF/ILE
Washington, D.C. 20330

Dear Sir:

(1) In reading the draft ES for the propsoed COR in the Nevada-Utah region, I found very little mention of the Desert Game Range which lies just northwest of Las Vegas. Also the map on Page 2-38 shows no repeaters, terminals or threat simulator sites in the area. Therefore, I assume that except for a small increase in numbers of flights over the area, there will be no change in Air Force use of the area. If it is later decided that facilities are needed in the area, I further assume that installation will be preceeded by appropriate studies and public notification.

Sincerely,

Marianne Slagle
Chairman, Las Vegas Group
Tonopah Chapter of Sierra Club

Responses to Comments by Marianne Slagle, Chairman, Las Vegas Group, Tonopah Chapter, Sierra Club

(1) Air Force operations on the Desert National Wildlife Range are conducted under a Memorandum of Understanding with the Fish and Wildlife Service of the Department of the Interior. (Pages 1-7 and 2-4)

The Air Force is appreciative of the interest in this project taken by the Sierra Club and we hope that the Sierra Club will continue to share with us their knowledge and opinions regarding the environment in the COR region.

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

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DEPARTMENT OF POLITICAL SCIENCE   SANTA BARBARA, CALIFORNIA 93106

July 19, 1974

Col. Herbert E. Bell
USAF, BSC
Chief, Environmental Protection Grp.
Directorate of Civil Engineering
Department of the Air Force
Headquarters United States Air Force
Washington, D. C. 20330

Dear Colonel Bell:

(1) Thank you for your letter of June 28 accompanied by the Draft Environmental Statement on Proposed Continental Operations Range (COR). As a consultant to General Research Corporation, I participated in its preparation and therefore have a legitimate interest in the final result.

After having reviewed the statement, I have two reservations about it as it presently stands:

(2) 1) I do not believe that the statement adequately expresses the values associated with the desert as viewed from the standpoint of one concerned about esthetics, open space, and wilderness. I think it is increasingly clear that the American public wishes to ensure the protection of areas whose chief value may be absence of intense human activity. The desert may be a very important resource for those who wish solitude and a landscape relatively unscathed by man. I do not mean to argue that reservation of the desert for this purpose is necessarily its highest use. Indeed, there may be compelling arguments for use of the desert for COR operations. Nevertheless the environmental statement should recognize that there are important alternative values and spell them out clearly.

(3) 2) I have used the term "use" of the desert in a way that may seem objectionable since COR operations will be chiefly above rather than on the surface of the ground. Nevertheless, I believe the statement minimizes to a point I find unsatisfactory the potential impact of COR operations on individuals, communities, and animal life on the land surface. I refer specifically to the noise levels and the sonic booms that inevitably will be the consequence of COR operations. While noise may be tolerable, it may equally be

offensive. Moreover, it may cause significant changes in both the human and natural ecology. The impact of COR operations may be sufficiently objectionable as to lead interests offended by COR operations to engage in law suits with the Air Force. The minimization of potential noise and sonic boom impacts has meant that the statement has virtually ignored the possibility of litigation to proteet values diminished by these intrusions. Therefore, in my judgment, the statement should be strengthened by reference to what is known about noise and sonic booms and the possibility of legal action.

I appreciate the opportunity to review the statement and I trust my observations will be taken as a sincere effort to improve the quality of the statement for the purpose of protecting the environment.

Sincerely,

Dean E. Mann
Professor

DEM:rs

CC: Mr. Arve Sjovold
General Research Corporation
5383 Hollister Avenue
Santa Barbara, California

Response to Comments by Professor Dean Mann

(1) The Air Force is grateful for the contributions by Professor Mann in the preparation of the Draft Environmental Statement. We are equally grateful for his review of the finished Draft Statement.

(2) Several comments were received in addition to Professor Mann's regarding deficiencies in the Statement in the treatment of wilderness values. We have responded to these comments by including additional information on the nature and distribution of lands in the TRC region that have acknowledged or de facto wilderness values. This information will be essential to minimize TRC impacts on wilderness resources. The Air Force will continue to seek guidance on methods and techniques by which impacts on values such as solitude, stillness and wilderness can be objectively evaluated. (Sections 1D, 2A, 2B, 2C and 3C)

(3) The Air Force is aware of the legal implications inherent in certain aspects of aircraft flight operations. Although the analysis of TRC generated noise impacts shows there is a possibility of compliants, the expected levels and occurrences should not detract significantly if at all from an individual's private use and enjoyment of land. To clarify the assessment on noise impacts, the Statement has been revised to include a mapping of aircraft noise exposure forecasts in the Las Vegas area. Furthermore the Air Force is aware of its obligations to land holders and communities that may potentially be affected and have instituted procedures to coordinate airspace uses with land uses. These procedures are embodied in the concept of Air Installation Compatible Use Zoning (AICUZ), which is discussed in the Statement.

The Air Force is also aware of the numerous damage claims arising from aircraft overflights, most notably in cases where some commercial enterprise has been adversely affected. Many of these cases involve the raising of domestic animals in commercial enterprises. In fact, the greatest body of literature dealing with the quantitative analysis of noise and sonic boom impacts on animals derives from investigations necessary to these litigations. The Air Force has used this information in its general assessments of TRC noise impacts on animals. No potential impacts directly affecting specific farm commercial enterprises in the TRC area were identified. Possible indirect impacts in the form of inconveniences to ranchers using their aircraft in cattle operations were identified, although there should be an increased measure of safety in the undertaking of such opertions. (Pages 1-30 through 1-36, Sections 2D, 3A, and 3C)

ANNEX C

HEARING RECORD TRANSCRIPT

This annex presents first a transcript of the public hearing on the Draft Environmental Statement for COR, held in Las Vegas, 7:00 p.m., 30 July 1974. The first part of the hearing transcript is a presentation by Air Force officers describing the proposed development and use of the Continental Operations Range. This presentation is followed by a transcription of the question and answer period wherein the Air Force sought to clear up uncertainties or misunderstandings regarding the COR. This is followed by the transcription of the comment period wherein members of the hearing audience were encouraged to offer comments, opinions, or criticisms about the COR project. Few comments, opinions or criticisms were raised since most people indicated that they had had insufficient time to study the Draft Statement. In general, all of the questions were met with direct answers during the hearing. Similarly the few comments, opinions, and criticisms were addressed and discussed directly during the hearing.

The public hearing was held to discuss the COR Environmental Statement which encompassed the total TFWC Range Complex. The COR concept has since been disapproved, however the TRC mission will continue. This transcript is being included in this FES to record the results of the hearing as it addressed the TRC geographic area and its environmental impact.

PUBLIC HEARING

DRAFT ENVIRONMENTAL STATEMENT

FOR

PROPOSED

CONTINENTAL OPERATIONS RANGE

UNITED STATES AIR FORCE

HELD AT LAS VEGAS CONVENTION CENTER

LAS VEGAS, NEVADA

7:00 P.M., 30 JULY 1974

COL MILZER: Good evening, ladies and gentlemen. I am Colonel Milzer, Staff Judge Advocate of the Tactical Fighter Weapons Center at Nellis Air Force Base, and I have been directed to conduct an informal public hearing on the Draft Environmental Statement on a proposed Continental Operations Range.

In a few minutes I will call on Colonel Salvucci, the Continental Operations Range Commander, to briefly describe its function and the extent of its operation. This hearing is scheduled for the purpose of receiving public comments on the Draft Environmental Statement. A transcript of this hearing will be made and the Air Force will analyze the comments made, after which the Air Force will prepare a Final Environmental Statement that takes into account and is responsive to these comments. In addition to any statement made at this hearing, any of you may submit a written comment, if you wish, before August twentieth, and I will give you the address in Washington, the office to send such statement.

Now, my role in this proceeding is simply to conduct the hearing. I will not make a decision or offer a recommendation on the proposal, in fact I have had nothing to do with the drafting of the statement itself. As I stated earlier, this is an informal hearing and the Air Force wants to gain an understanding of the feelings and opinions in this area concerning the environmental aspects of the proposed range.

I want to insure that these proceedings are conducted in an orderly manner with only one person speaking at a time. Due to the rather sparse attendance here I do not anticipate a problem along that line, but we will proceed as follows; after Colonel Salvucci describes the project there will be an opportunity for clarifying questions from the floor, and this is to insure that everyone is clear on what the Air Force proposes I cannot allow argumentative questions, leading questions, statements disguised as questions, or other forms of cross-examination. However, as I stated earlier, please feel free to ask a question if you desire clarification of Colonel Salvucci's presentation. There are other representatives here who have expertise in the different areas involved, and I will introduce them shortly. Those who wish to comment rather than query will have an opportunity following the question period. As you entered the room you were asked by one of the sergeants if you cared to make a public comment or statement, and we have two who have indicated they wish to do so. Now, if after those who have indicated they wish to make a statement have finished, if you then decide that you yourself wish to comment, and it does not have to be a prepared statement it can be right off the cuff, if you will raise your hand I will recognize you for any such statement.

Major Wright will act as my assistant, and Mister Ulrey, who is the court reporter. There will be a verbatim transcript of this record.

I might add also that if you have any written statement that you wish rather than to read to attach, you can give it to Major Wright at the conclusion of this hearing, or you can mail it to the Office of

the Staff Judge Advocate at Nellis Air Force Base. That statement will have to arrive by Monday because this transcript is going to be prepared quickly and sent to Washington.

I mentioned Colonel Salvucci who will be making the presentation shortly. In addition, we have Lieutenant Colonel Sadek, Air Operations Officer for the COR Group, and would you please stand as I give your names. We have Lieutenant Colonel William Adams, who is the Vice Commander of the COR Group. I am using the word COR as it means Continental Operations Range. There is Lieutenant Colonel Daube who is the Safety Advisor, Test and Evaluation Systems Program Office; Major Fay who is the Headquarters USAF, Directorate of Operations; Doctor Brenton who is a Technical Consultant, Systems Engineering and Technical Assistance to Test and Evaluations Systems Program Office; Mister Sjovold is Technical Consultant on Environmental Statement to Test and Evaluation Systems Program Office. At this time, Colonel Salvucci, you may proceed.

(Lights turned out, slide projector presentation made during Colonel Salvucci's speech.)

COL SALVUCCI: Ladies and gentlemen, my presentation today has been designed to give you an overall view of the proposed COR in terms of how the concept developed, what it is, how the Air Force intends to use it, assuming, of course, that our proposals are accepted and the program continues to progress.

The essential requirement of the Air Force is to fly, to fight, and to win. Therefore, everything we do is pointed toward one goal, to help those who will actually be doing the flying and fighting to do it better. That is why the Air Force continually strives to modernize and upgrade the aircraft that we use, the weapons that we have, and the training of those that will use them in the event that they are ever called upon to do so.

Beginning with World War II we know now that if some way had been developed to simulate an enemy's capability and defenses it would have been much easier for Allied aircrews to penetrate them because they would have known what to expect. The same experience was found true in Korea. Here, as in World War II, aircrews could not be trained in enemy tactics because they had not yet been in any way developed to simulate and, therefore, exploit the enemies capabilities. This truth was brought home again to us in Southeast Asia. We recognized again the simple truth that the more combat experience our aircrews had the better their chances for survival and successful completion of their missions. In fact we found out there was a very dramatic increase in the survival rate once the aircrew had completed about 30 missions. This historical background is mentioned only because it describes what long standing concern for the survival of our men and the problems that the Air Force is facing if we are to function effectively in a modern day technology. In short, we must have the means to test the aircraft that we presently have as well as those that are being developed, to train our aircrews to fly them more effectively than anyone else in

the world, and to insure that the weapons available to them are the very best that our country's technology can produce.

The concept for the Continental Operations Range grew out of these problems, and is nothing more than a step by step program to build on present capabilities. We have a number of test and training ranges in the Las Vegas area used for a wide variety of purposes. In addition, there are also ranges located about two hundred miles to the northeast in the vicinity of Salt Lake City. To the northwest again about two hundred miles, another range operated by the U. S. Navy Fallon Naval Air Station. What we are proposing under COR is to improve these ranges considerably, modify management of the airspace around the Las Vegas ranges slightly, link them together electronically so that the facilities of each are available for realistic simulation of anything that our military intelligence believes a potential enemy is capable of doing. Our planned improvements for the next two years center in the Las Vegas area because the majority of the usable ranges are located here. The major improvements that we propose in this area is the procurement and installation of an improved communications and radar net that will enable us to electronically scan low altitudes with radar and thereby provide a flight following service for any aircraft flying in the southern most part of the Great Basin. We think that this will give us an ability to provide a degree or safety that is presently lacking throughout the area. Inputs from this communications and radar net will be piped into a COR, Continental Operations Range, facility at Nellis Air Force Base that will be manned by

qualified Air Force controllers around the clock. We are not proposing that the airspace of COR North or COR East be restricted to Air Force use only. By providing a flight following service both we and the civilian community can share the use of the area just as we do not. The other major changes is that each of us can be aware of each others locations and intentions. Now, of course, to do this assumes that everybody flying in the area is equipped with a radio to talk with the central control. We know that this is not the case, there are some small aircraft that do fly without radios, therefore, we have proposed VFR flyaways that can be used by anyone at any time without broad casting his intentions or filing a flight plan. We have also proposed that the airspace labeled R48XX be established in an interim restricted area from 200 feet above the ground to 18,000 feet. This is a temporary measure and it is required only to achieve the COR objective or mission accomplishment with the greatest possible degree of safety. Communications and radar coverage to insure safe joint civilian and military usage in R48XX will not be available for approximately one to two years. When our capability becomes such that we can provide an effective advisory service, we will make an additional airspace proposal to FAA requesting that R48XX be revoked and that the flights in that airspace be handled in the same manner as those in COR North and COR East.

The COR proposals also provide for release of some present restricted areas from the Nellis Range Complexes for the civilian air operations in the event that they are not in use by the Air Force or AEC. This is

something that we are unable to do at the present time because we do not have a real-time capability that lets us know what specific areas are in use. We will have this capability in COR because control is in COR Central, and we will be able to electronically see the restricted area. If they are not active we will release the airspace for use by others.

There is no major land acquisition planned or needed to implement the proposed COR. There may, however, be some small parcels in the order of five acres or less for the placement of mobile type equipments. Neither will any land areas be closed to sportmen, agriculture or mining interests. We will be flying over the same areas that we are presently flying. The difference between present conditions and what COR proposes is that everyone will be able to operate in the Nellis/AEC area with a greater degree of safety. Along this same line supersonic operations will continue to take place in the areas that are now designated for them. Live ordnance and practice ordance will continue to be dropped in existing ranges. COR development for the next two years also envisions that air corridors will be established to facilitate entrance and exit from the Las Vegas ranges in Southern Nevada to those in the Western portion of Utah around Salt Lake City. These corridors are not fixed; I show them only as examples. Whenever these corridors are to be used we will operate under FAA or COR Control. Flights over areas not encompassing the ranges will be prior coordinated with the controlling agencies to prevent flight complex with other traffic.

Internal improvements on the Las Vegas ranges for the next two years can best be summarized by saying that we intend to duplicate to the maximum extent possible an enemies offensive and defensive capabilities. The concept of operations for the range involves an independent, realistically equipped Red, or enemy threat force, with its own command and control system. The Red Force will operate under its own doctrine and use an array of electronic simulators, replicas of enemy aircraft and equipment, defensive aircraft, and even its own radar to defend against an independent Blue, or friendly force. The Blue Force in turn will use its own doctrine and command control that we would plan to use in an actual combat situation. The Blue Force may be a strike size element of many aircraft, or just a two-ship training mission. To complete the picture, a White, or umpire force, will umpire from the COR central facility at Nellis. The White Force, using an elaborate system of communications, data processing and air traffic functions will monitor range safety and process test results.

Following these improvements in the Las Vegas ranges we propose to begin the same type of improvements in the existing ranges in the Salt Lake City area of Utah. These improvements based upon our present time table should begin some time around 1976 and be completed in late 78 or 79. During the same time period these two major range areas will be linked with refined communications and data links, but each will retain the ability to be able to operate independently as required for normal day to day operations. As these improvements have been made we foresee a general consolidation of range control and the eventual

inclusion of the Navy Fallon Range in the vicinity of Reno into the COR complex.

There is no COR requirement for airspace in these areas. What does this mean to the State of Nevada? As the Environmental Statement outlines, there will be a gradual increase in the number of people in the Southern Nevada area. It is difficult to be precise in planning because in planning of programs that extends ten years into the future. However, the Continental Operations Range Group, which will control and schedule the ranges, now has approximately four hundred people. This is expected to grow to about seven hundred by 1979. Most of the poeple will be working in the Southern Nevada area. We anticipate that the personnel contingent will continue to grow as the COR capability grows. Our best estimate concerning future funding is approximately two hundred million dollars will be spent over the next ten years to provide the capability that we are looking for. As the program is funded by Congress, the COR is expected to generate about four and a half million dollars in construction this year, or this coming fiscal year, at Nellis, and nearly one million in construction at Indian Springs. There will be some increases in air operations as the COR capability continues to grow, but it will be largely due to the predicted increase in the number of large-scale exercises that are held in this area. And these are nothing new, similar exercises have been held in Nevada for the past two years. We emphasis that there will be little noticable difference between our present operations and our proposed operations in the COR. There is one area though where change is going to be

significant, and this is in the area of improved flying safety. Air Force controllers on-duty around the clock will be able to electronically link or electronically see a large portion of airspace in Southern Nevada, and provide an advisory service to everyone, civilian or military, flying through it. Of course, some of the most obvious spin-offs of the vectors for private aircraft, advisories of other aircraft in the vicinity and immediate assistance in search and rescue operations in the event of a crash. These services are not available now at lower altitudes. They will be in the proposed COR because of the extensive instrumentation associated with the program.

The total proposed program is designed to improve an existing capability over a ten year period. All of the COR proposals are fashioned in such a way so that they can be implemented step by step. The environmental aspects of the proposed COR have been outlined in detail in the Environmental Statement. To attempt to cover each of them separately in this presentation would be redundant since our purpose here tonight is to accept public comments in this regard. In summary, we have proposed the COR to correct a long standing operational and testing deficiency. The thrust of the program is to use existing test and training ranges to achieve this capability. By electronically linking the areas together we will have in a sense created a new complex without physically moving existing ranges to new locations. This is true because it makes little difference electronically whether an event is occurring two hundred yards away or two hundred miles away, as long as the capability exists to accept the data inputs and retrieve them at

will for immediate analysis of test and training results. And this is what we are proposing in, attempting, and achieveing in the Continental Operations Range.

Ladies and gentlemen, that completes the formal presentation.

(Lights turned back on.)

COL MILZER: Thank you, Colonel Salvucci. All right, at this time, as I stated earlier, we invite any questions that you may have of Colonel Salvucci or any other representatives who have expertise in these areas. I realize Colonel Salvucci is a pretty fast speaker, he may have gone over it a little bit too fast, but if you would just raise your hand, and if you feel you can be heard by everyone from where you are you may stay there, otherwise please come down to the microphone in the aisle here and we would like to have you state your name for the record, but it is not required.

Are there any questions at this time?

UNIDENTIFIED: I just have one question, I didn't hear, or perhaps you stated it earlier before I came in, or stated it other places, but what is the closing date for receiving written comments?

COL MILZER: You have until August twentieth to send a written statement to Washington, and we will give you the address of the office there, it is pretty long as they all are up at the Pentagon, right after the meeting. This gentlemen, yes?

(1) UNIDENTIFIED: I have a question on -- I imagine there will be more aircraft flying out of Nellis than what there is normally won't there, or during this period?

COL SALVUCCI: Not appreciably more. In some of my briefings to the Air Staff, we indicate a level today -- let me take these figures out of the top of my head -- we indicate a level of 1,000 per two months. Our projected increase for ten years from now is let's say 1,050, something like that. The additional flights, the additional sorties as the years go by do not increase appreciably.

UNIDENTIFIED: My point in bringing it up is I live in the near vicinity of your take-off runways, and believe me it sure is noisy, and I sure would hate to see any more of it. In fact I don't understand why Uncle Sam doesn't do something to quiet down those engines. I don't think it's necessary. And the people living in the area -- and like I imagine any how you will have early morning sorties and late night and all night, all of the people in that area to get woke up by those cockeyed engines of military necessity, after all we don't need all of that noise.

COL MILZER: May I just interject here, you will have an opportunity to -- you are in the comment area now, at this time I would like to limit it to specific questions about the COR, and I will be happy to call upon you on that area or anything else later. Do we have any -- Yes?

(2) UNIDENTIFIED: Am I to understand the August twentieth date is an extension of the August second date notice in the Federal Register?

COL MILZER: Yes, forty-five days is the time period, and I believe the extension is because of the change in the date of the hearing. Colonel Sadek, can you answer this?

LT COL SADEK: I believe there is an element of confusion here. The close of comment period 2 August is for the airspace proposal which is being processed under another statute and regulatory action by the FAA. It is not related to the environmental aspect.

COL MILZER: So you would have until the twentieth of August.

COL SALVUCCI: Colonel, I'm not sure that everyone got your first comments about if they have anything in writing to attach to this meeting they have to have it in by next Monday.

COL MILZER: Yes, if you wish a statement to be attached to this transcript, and if you can get it to my office by Monday, in other words, you have five days until Monday, we will attach it to the transcript of this hearing and forward it. But your statement that you send to Washington, which you would have more time to prepare, would be considered just as this one would.

Yes?

(3) UNIDENTIFIED: Has there been a count made of the private aircraft based in Lincoln County?

COL MILZER: Can one of our people answer that, or guess at the number?

MR. SJOVOLD: We didn't actually make a count of the aircraft based, we went to the fixed base operators and flight service stations et cetera, getting all the data we could on flight operations in these areas. It is reported in the Environmental Draft Statement as to the best available data we can get, but it is not based on aircraft count, but it is based on aircraft movements that we could get from the verbal comments to us plus whatever data they did have.

COL MILZER: Can everyone hear by the way, otherwise we will ask them to use the microphone. If you can't hear or have not been able to hear, raise your hands? (Negative response.)

(4) UNIDENTIFIED: My next question, what form of agreement would you propose for those aircraft that are based on ranches there that now fly in that area?

LT COL SADEK: These agreements depend on the individual operation, a rancher for example, periodically, regularly, or otherwise flies to various geographical area to check on water supplies, food, status of

cattle, et cetera. We will talk with these people and make arrangements for them to operate just as they do now. There is a very great likelihood that we will be able to talk with them even though we would presume they are operating at very low altitudes. If we are unable to talk to them then we will have a procedure whereby which we will know approximately when he is going to operate in what area, or what altitude. We have the electronic means to identify that geographical area, the altitude beam, clearance, and provided advisors in advance to him that we do have some operations through that area periodically, if we have none we advise our people of his operations, and that way gain the intelligence necessary to improve safety in the area. There will be no constraints against his operations.

COL MILZER: Does that answer your question? (Unidentified nodding.) We have a gentleman here.

(5) UNIDENTIFIED: Colonel, you have indicated an increase of approximately five percent in your present operations, at what period of time was that?

COL SALVUCCI: That is over the next ten years.

UNIDENTIFIED: Then I could assume that you are using the flights that are flying right now as part of the COR program, is that correct?

COL SALVUCCI: Yes. Is there another question?

(6) UNIDENTIFIED: How much extra power is going to be used for your improved radar communications capabilities? Has there been a detailed analysis of that in your environmental impact? Are power capabilities in fact available in this area, electrical power?

COL SALVUCCI: The electrical power is available in this area. It is the state of our equipment in this area, we may have to run some new lines to some out-laying districts. You mean is power available in timbucktoo, is that what you are speaking of, or just the power available in the whole State?

UNIDENTIFIED: Power available primarily in Southern Nevada. I mean has the impact -- the environmental impact statement addressed itself to that potential problem, if there is a potential problem there?

COL SALVUCCI: Doctor Sjovold, has that been addressed to that?

MR. SJOVOLD: I was just checking, this is the electrical power?

COL SALVUCCI: Yes.

MR. SJOVOLD: We did address that in the statement, yes. I wasn't listening clearly.

COL MILZER: The question he wants to know, what increase in electrical power as a result of the COR operation?

LT COL SADEK: An overall drain of the power?

COL MILZER: Yes.

MR. SJOVOLD: We did not access that quantatively, we will be mobile for some simulators and in many cases they will use mobile generators and so forth. So it is not going to draw extensively on existing power.

COL MILZER: I believe you had another question here?

(7) UNIDENTIFIED: I just wanted to ask the question concerning the existing supersonic routes over Nevada, and I'm not entirely familiar with the terminology used for these routes, but I know they have oil burner routes, et cetera, low altitude routes, high speed routes. Could you explain what you see as the future supersonic flight paths through the State of Nevada?

COL MILZER: Do we have someone that can address that?

COL SALVUCCI: I'll address that. I think that is a premature question, we have a training area with a canned supersonic route right now.

It is mainly used for testing our aircraft everytime it comes out of maintenance it goes through a test, and when it is supersonically it is in this particular track, it is above 30,000 feet and it runs north and south from Las Vegas heading north. There are many low altitude routes throughout the state of Nevada, as well as all of the states in the country. They have been in existence for many, many years. Right now I do not foresee any supersonic routes at low altitude on the deck. I don't think I could buy it, I don't think I could sell it. But there are routes in existence today and they are in relation all around the country. Maps are available to the public and the flight planning guides that all pilots use, and the public may see them.

COL MILZER: Yes?

(8) UNIDENTIFIED: I was wondering if there would be a change in the -- you stated there isn't a great increase in the number of flights over a ten year period, but what about the changes in altitudes of the flights, will there be an increase in low level flights in the corridors between ranges and on approaches to the ranges?

COL SALVUCCI: I would say not, and really that depends upon the tactics that are being developed in the future. Our tactics change with every war that comes along. As you remember during World War II the bombers flew at high altitude and they got shot down as well as flying

at low altitude. Our tactics before the Korean war was to fly at low altitude and to get into the target area. That was shot down in Southeast Asia, we had to go to medium altitude. So I cannot definitely tell you right now whether we are going to fly increased low altitudes within our range areas. Existing range areas, yes, we will be flying low, high and everything else. The approaches to the range areas we have gone and tried to accommodate as much as possible the populace that is around those range areas. I wouldn't think we would go on the deck supersonic right over a town, that's not our plan.

UNIDENTIFIED: But is this -- are these primarily tactical maneuvers, I mean they're not as opposed to Strategic Air Command operations?

COL SALVUCCI: They could be either, and that really depends upon our capability to provide a capability for users, that is the testing user or the training user. So it could be either strategic or tactical.

COL MILZER: Very good, do we have any other questions? (Negative response.)

Yes, Mister Jack Helvie of 1500 North Decatur, who is affiliated with the Fish and Wildlife Service, you may present your statement. Would you use your microphone over here, please?

MR. HELVIE: Thank you, Colonel Milzer. Good evening ladies and gentlemen.

My name is Jack Helvie, I am Refuge Manager of Desert National Wildlife Range and am representing Mister R. Kahler Martinson, who is Regional Director of the Fish and Wildlife Service in Portland, Oregon. Due to insufficient time for a thorough review of the Draft Environmental Statement for the proposed Continental Operations Range, our agency is not prepared to comment at this time but will submit a written statement for the record on the Environmental Statement at a later date.

Thank you, Colonel Milzer, ladies and gentlemen.

COL MILZER: Thank you, Mister Helvie, we will give you the full address where to submit that. We have a Mister Howard Booth, who is affiliated with the Nevada Open Spaces Council.

(9) MR. BOOTH: My statement will be very brief tonight, it is simply that we haven't had time to look at the statement very long, we got it in the mail last Friday and we haven't had time to absorb it yet. Just a word I think of criticism, I think we should have had the impact statement a little bit longer to look it over, if you expected a response this soon. It's a pretty thick document.

COL SALVUCCI: Yes, it is.

MR. BOOTH: Thank you.

COL MILZER: I can't quarrel with that last statement of yours, I am sorry you didn't have more time, Mister Booth. But as I stated, I will give you the address, or you may submit it to my office as I stated.

Mister J. Kenneth Pilkington, who is a North Las Vegas businessman?

MR. PILKINGTON: No statement.

COL MILZER: The gentleman who during the question period was getting more into a comment would you like to make a statement?

(10) MR. NAPP: I might as well get my feet wet, my name is Charles Napp. And just like I said before, if these flights, I imagine they are going to be flying all night long, is that true, at times be take-offs and landings?

COL SALVUCCI: There will be some night flights, yes, just as there are today.

MR. NAPP: Couldn't a guy get a break and you guys go to bed too about nine o'clock instead of getting out at daylight and going all day?

(Audience all laughing.)

COL SALVUCCI: Sir, I am running a range, the schedule is taken by the 57th Wing. Actual flying activities are done by other users really, I do not control the scheduled flights.

MR. NAPP: I wish that gentleman was here because I know I am just one of many that flat just don't like being disturbed on weekends, I don't like to be woke up in the middle of the night by somebody taking off by these blasted things, they wake the dead and particularly when they come down to the end of the runway and they are going to take off north, they will wind them things up and they let their afterburners go or whatever it is, and man they will drive you right out of bed. That's not my way to go. And that's my whole complaint, I could care less what you do with the rest of Nevada, could I ask you, sir to keep those cockeyed planes out on the other end somewhere, so that's just about what it amounts to, to shut down that noise. Thank you.

COL MILZER: You are entirely welcome.

Do we have anyone else who did not submit a card who wishes to make a statement, I think I saw a hand back there?

(11) MR. GILLIGAM: Yes, sir, I'm Bob -- Robert Gilligam. I'm not so worried about the environmental situation as I am the possibility of collision. My dad owns a small ranch outside of Lathrop Wells, about ten miles down the highway toward the California border, anyway every once in a while you see some really weird looking airplanes flying around

out there, and I guess maybe experimental, I don't know. But anyway, some of them seem to fly extremely low and I myself was on a flight to Reno and I fly a small plane, mostly a 150 or 172 Cessna, and anyway it doesn't fly that awful high, you know, maybe seven, eight thousand, nine thousand feet. And one day I was flying up to Reno and I saw a B-52 or something right underneath me. The only thing I'm concerned with is there anybody that I can get in contact with, like say Nellis or somebody like that, so that I can just sorta keep my flight plan our of theirs so to speak?

COL MILZER: I think Colonel Salvucci mentioned that actually with this COR, the safety factor will be improved, and that is what you are talking about?

MR. GILLIGAM: That's the only thing I'm interested in myself.

COL MILZER: Can you enlarge a little bit on that?

COL SALVUCCI: Yes. We have ran into groups in the past that have either wanted no control of lots of control, and there is hardly any in-between. We are trying to build a capability where we will have control, we will be able to see things. I think your specific question, sir, is who do you contact today to stay out of trouble?

MR. GILLIGAM: That's right.

COL SALVUCCI: Do you normally fly IFR flight plan or VFR?

MR. GILLIGAM: A lot of times I fly -- I file a VFR flight plan and call it into McCarran Field in most cases.

COL SALVUCCI: You're doing everything you can, you are filing a VFR flight plan, they should be giving you advisory on B-52s flying under you. I don't know but I would think that that B-52 was on an oil burner route, but I don't know, but he has to file a clearance also.

MR. GILLIGAM: The only thing I am concerned about is if there is anybody that I could get in contact with, like to as you say flight service stations here at McCarran or anybody that I can call.

COL SALVUCCI: You've got a good point, can you contact Lieutenant Colonel Sadek at Nellis Air Force Base, and he is an expert in my field, or this particular field and he will help out this individual problem, at least he will try.

LT COL SADEK: 643-2430.

COL MILZER: I think that's a good way to handle it because that is his problem, an individual problem rather than the overall operation.

We have a Mister Bullock who is a private pilot who wishes to make a statement.

MR. BULLOCK: I got here so late I don't know what all has transpired, so I thought I'd better listen for a minute then I'll talk about it, consider making a statement.

COL MILZER: Yours is the last card that I have up here of those that have expressed a desire to make a statement.

MR. BULLOCK: All I can do is ask dumb questions then because you have already gone over it.

COL MILZER: Sir, go ahead and state what you wish, we will field it the best we can.

(12) MR. BULLOCK: I'm a private pilot, I have a home in Panaca, Nevada, and I experience a great deal of traffic between here and Panac And we travel quite a bit from Panaca to Cedar City, and I have a ranch on Cedar Mountain. There is a strip both on my ranch and there is one seventeen miles away. And I am just concerned if this is going to make it prohibitative for me to get to these various airports? I do a lot of traveling in this particular area and one is in Zion National Park and the other in Cedar City, and Panaca, and I'm not really too concerned about anything else, but I am concerned about being able to get to and from those places. It takes seven hours, some times eight hours, to drive from here to the ranch. In an hour and ten minutes I can be setting on the ground. If you are going to do anything on a

weekend or look after your cattle or take care of anything you can spend two days going and coming. And that's why we have an airplane.

COL MILZER: All right, we will have someone discuss that situation. Do you have anything further?

MR. BULLOCK: No, that was all, my main concern, I just don't want to get put out of the flying business.

COL SALVUCCI: Do you want to reiterate what you just mentioned to this gentleman?

LT COL SADEK: We are prepared, if we can just talk to you a little bit, find out what kind of operation you wish to conduct, we are ready for you to operate without any restraint. The one requirement that is attendant to the airspace proposal which involves the Panaca area is that if you are radio equipped that you talk to us.

MR. BULLOCK: I am radio equipped.

LT COL SADEK: You are in like flynn, all you are going to do is get increased safety.

MR. BULLOCK: That's all I'm interested in.

LT COL SADEK: We want the intelligence on who is operating and how so that we can avoid conflict, this is the purpose of the whole thing.

MR. BULLOCK: As long as it doesn't put me out of business.

COL SALVUCCI: No, it is not that intent at all. As Colonel Sadek says, you can't talk to COR today, we don't have that capability today, that is what we are proposing to have in the future. But by all means if you have a radio equipped aircraft we're really in bed with you, no problems at all.

MR. BULLOCK: I wouldn't be going any place in an airplane that doesn't have a radio.

COL SALVUCCI: I agree with you.

COL MILZER: There is a gentleman in the rear that wishes to make a comment?

(13) UNIDENTIFIED: I just had one question of interest as a pilot also, the comments that you have made here have been addressed to, for example, people who may already have a small ranch or an operation right now. I assume that the same availability or arrangements would be worked with any people who need flying, or building or grading out a strip later on, is that correct?

COL SALVUCCI: That is correct.

UNIDENTIFIED: Thank you.

COL MILZER: The gentleman in the yellow shirt?

(14) MR. ALCOTT: My name is George Alcott, and I am a member of the Las Vegas Radio Amateur Club, and we are really not interested in too much in overall affect on Nevada too much and I am really not here in an official -- I didn't submit a card. I am wondering how the electromagnetic pollution is going to effect us hams in Nevada, and I am mainly concerned with extremely high power radar and limitations of legitimate licensed amateur radio operations. If there is somebody I could talk to specifically about that I would like to.

COL MILZER: Do we have someone who can address that?

LT COL SADEK: I can address it in general terms.

COL MILZER: Okay, Colonel Sadek, would you go ahead?

LT COL SADEK: In general terms I will have to refer to your experiences to date because we have been conducting electronic warfare during, that is the emmenation of various signals and various bands for quite a period of time during the exercises. I would suspect that in

the first place when you say high powered radar, the radars that we are talking about in general are those that put out and have a power output essentially to that equal of the traffic control radars that you stand and look at every time you go onto any large commercial airport in the United States. There are minor sides, of course that does atinuate certain signals. I think that some of your signals may have some impact on us. Now to the extent that we can live with it, and to the extent that our emissions I believe would bother you, if we do have some problems these we should discuss. I am sure we can arrive at a level of compatibility. That was one of the things that COR is attempting to do.

MR. ALCOTT: Is there some individual that I could talk to specifically about that, if that arrives later at Nellis or something like that?

COL SALVUCCI: If you will leave your name and address we will find out the correct man with the correct expertise, yes, sir, we do have.

MR. ALCOTT: Thank you.

COL MILZER: Do we have any further comment from anyone present?

(15) MR. PILKINGTON: When I came in here your sergeant asked me if I wanted to speak, I said "I'm not sure whether I do or not", but I hope my comments are relative to your hearing. But I was sitting here

listening to the comments back and forth, it brought a few things to my mind. I just completed a year as President of the North Las Vegas Rotary Club, and during that year we had many speakers and your COR program incidently was presented to us. I am sorry that I wasn't as attentive at that meeting as I was tonight, but one program that I remember and I'll not forget, they had someone from the United States Navy bring in a program showing the difference and the superiority of Russia versus the United States, and believe me it was frightening. And I as a citizen of this country am so happy to see that someone in Washington had had the foresight to, without the aid of a war, prepare our forces by using something like COR so that we are ready if and when the next one does happen.

And the other statement that I had is that as a taxpayer I am certainly glad to see that we are spending our money in the United States and not on some foreign shores where we are later thrown out after making big investments.

Thank you.

COL MILZER: I thank you very much.

Do we have any further comment or statement from anyone? (Negative response.)

No comments from anyone, very well, I want to thank all of you -- excuse me, we do have one?

MR. COLE: Are you trying to close the hearing?

COL MILZER: If there is no further comment?

MR. COLE: I would like the record to reflect that I am Robert Cole of the Public Service Commission of Nevada and we would like to be placed on the mailing list of any future proceedings that arise out of this particular hearing and thereafter.

COL MILZER: Is there anything further or anyone else wishes to present? Yes, our private pilot?

(16) MR. GILLIGAM: Yes, this isn't really in relation to private pilot part, what I am concerned about is I don't know if you plan on it or not, but like Fallon I know is a Naval Air Station, is it possible that you guys can get together and all of you use one big range rather than say taking up the entire State with the COR complex?

COL SALVUCCI: Again I don't want to leave the impression that we are taking up the entire State.

MR. GILLIGAM: What I meant was if you guys can get together and make it an inter-service type thing where all the services can use it, this is a heck of a lot better place to have than say like California. California maybe twenty years ago wasn't very populated and was a good place to have a lot of training facilities, but as you will remember I think up at Alameda they had a heck of an accident, and I think they

are building up more at Fallon because of that. And this would be a good area of the country for doing this sort of program for testing high speed aircraft, or remote area, so if it could be made of multiple use between the Air Force, the Navy, the Army and whatever, you'd probably get the most benefit from the space that you intend to obtain.

COL SALVUCCI: I certainly agree, but that's going to have to be up to the Secretary of the Air Force, the Secretary of the Army, and the Secretary of the Navy. I don't have that much power to push those people, but it is working, the services are working together.

MR. GILLIGAM: That's what I mean, inter-service rivalry is a bad thing as far as I'm concerned. And I would just like more cooperation between the main branches of the service, and it would be in the best interests of our country I feel. This is just may own opinion.

COL SALVUCCI: I agree.

COL MILZER: All right, thank you.

Is there anything further? (Negative response.) Very well, there being nothing further this hearing will be closed. I have the address up here for anyone who wishes to mail a statement in.

COL SALVUCCI: Those persons who wanted to have personal contact with some of my group please come forward, I know the ham operator and the private pilot. (The hearing closed at 2200 hours, 30 July 1974.)

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